



Rim of the Pacific (RIMPAC)



Programmatic Environmental Assessment

June 2002

REPORT DOCUMENTATION PAGE				Form Approved OMB No. 0704-0188	
Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing this collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports (0704-0188), 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. PLEASE DO NOT RETURN YOUR FORM TO THE ABOVE ADDRESS.					
1. REPORT DATE (DD-MM-YYYY) 01-06-2002		2. REPORT TYPE		3. DATES COVERED (FROM - TO) xx-xx-2002 to xx-xx-2002	
4. TITLE AND SUBTITLE Rim of the Pacific (RIMPAC) Programmatic Environmental Assessment Unclassified				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME AND ADDRESS U.S. Navy xxxxx, xxxxxxxx				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME AND ADDRESS U.S. Navy ,				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT APUBLIC RELEASE ,					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT See report.					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:		17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19. NAME OF RESPONSIBLE PERSON	
		Public Release	235	EM121, (blank) lfenster@dtic.mil	
a. REPORT Unclassified	b. ABSTRACT Unclassified	c. THIS PAGE Unclassified	19b. TELEPHONE NUMBER International Area Code Area Code Telephone Number 703767-9007 DSN 427-9007		
				Standard Form 298 (Rev. 8-98) Prescribed by ANSI Std Z39.18	

DEPARTMENT OF DEFENSE
DEPARTMENT OF THE NAVY

FINDING OF NO SIGNIFICANT IMPACT (FONSI) FOR THE PROPOSED
PROGRAMMATIC ENVIRONMENTAL ASSESSMENT (PEA) FOR RIM OF THE
PACIFIC (RIMPAC) EXERCISES, HAWAII

Pursuant to section 102(2)(c) of the National Environmental Policy Act (NEPA) of 1969 and the Council on Environmental Quality regulations, (40 CFR Parts 1500-1508) implementing procedural provisions of NEPA, the Department of the Navy gives notice that a Programmatic Environmental Assessment (PEA) has been prepared and an Environmental Impact Statement (EIS) is not required for the implementation of future RIM OF THE PACIFIC (RIMPAC) exercises, including RIMPAC 2002.

RIMPAC is a multinational, sea control/power projection fleet exercise that has been performed biennially for the last 30 years. The purpose of RIMPAC is to implement a selected set of exercises that is combined into a sea control/power projection fleet training exercise in a multi-threat environment. RIMPAC exercises also demonstrate the ability of a multinational force to communicate and operate in simulated hostile scenarios. RIMPAC 2002 will be the eighteenth in a series involving forces from Australia, Canada and the United States; the twelfth involving the Japanese Maritime Self Defense Force; the seventh involving the Republic of Korea Navy; and the fourth involving the Chilean Navy. The United Kingdom, France and Peru have been accepted to participate in RIMPAC 2002. RIMPAC 2002 is scheduled to be conducted from 25 June to 23 July 2002.

During initial planning meetings in July 2001, the Action proponent, Commander, THIRD Fleet, gathered input from possible participants to understand the various testing and training needs. Operations personnel developed a general scenario to accommodate testing and training needs. As a result of three planning conferences considering budget and time constraints, as well as safety and environmental considerations, a final scenario and set of exercises were developed.

Table 1: RIMPAC Representative Schedule

Activity Average Exercise Days (Expanded Exercise Days)	Total Number of Average Exercise Days	Total Number of Expanded Exercise Days
Multinational Force arrives at Pearl Harbor Day 1 (Days 1-2)	1	2
Multinational Force In Port Briefings Days 1-6 (Days 1-9)	6	9
Bilateral Force Arrives at Pearl Harbor Day 1 (Days 1-2)	1	2
Bilateral Force in-port briefings Days 1-3 and 11-14 (Days 1-5 and 16-21)	7	11
Multinational Force Workup Exercises Days 7-20 (Days 15-36)	14	21
Bilateral Force workup exercises Days 3-10 and 15-20 (Days 5-15 and 22-36)	14	28
Tactical Scenario Exercises Days 20-29 (Days 36-49)	10	14
Amphibious Landing Exercises Days 23 and 29 (Days 34-35 and 45-49)	2	4
Amphibious back-load Days 24 and 30 (Days 35-36 and 49-50)	2	4
Bilateral Force returns to Pearl Harbor Days 29-30 (Days 49-52)	2	4
Multinational Force returns to Pearl Harbor Days 29-30 (Days 49-52)	2	4
Post Exercise Activities Days 30-32 (Days 52-56)	3	5
Dispersal Day 33 (Days 56-57)	1	2

The PEA identifies the Proposed Action as the set of exercises and locations that could be used for future biennial RIMPAC activities for the foreseeable future. The PEA bounds the maximum usage of on-going training assets and exercises that could be conducted within a given RIMPAC and evaluates the impacts on the environment. As long as future RIMPAC exercises do not exceed this maximum, or new locations or exercises are not added, the Proposed Action can be implemented without supplemental NEPA documentation. Thus, the scope of each future RIMPAC exercise will be evaluated for a consistency or non-consistency determination with the PEA and this FONSI.

The Programmatic RIMPAC, including RIMPAC 2002, begins with in-port briefings and preparations for all participants. Table 1 above lists a representative schedule of activities for future RIMPACs. Approximately 60 ships, 10 submarines, 260 aircraft, and 30,000 military personnel for purposes of this PEA were analyzed as the maximum potential RIMPAC activities. Approximately 33 ships, 5 submarines, 52 aircraft, and 10,600 military personnel will be involved in RIMPAC 2002.

Table 2 below lists the Programmatic RIMPAC exercises and locations. The exercises will occur in open-ocean, near shore and onshore environments where they are routinely conducted as individual exercises.

Table 2: Proposed RIMPAC Exercises and Locations

Exercise/Activity	Locations
In-port activities (IN-PORT)*	Pearl Harbor, Oahu*
Command and Control (C2)*	PMRF, Kauai*; Pearl Harbor, Oahu*; Marine Corps Base Hawaii, Oahu*; Hickam Air Force Base, Oahu; Wheeler Army Airfield, Oahu; Bradshaw Army Airfield, Hawaii; Pohakuloa Training Area, Hawaii*; U.S. command ships
Aircraft Operations Support (AIROPS)*	PMRF, Kauai*; Pearl Harbor, Oahu*; Coast Guard Air Station Barbers Point/Kalaeloa Airport, Oahu; Marine Corps Base Hawaii, Oahu*; Hickam Air Force Base, Oahu*; Wheeler Army Airfield, Oahu; Bradshaw Army Airfield, Hawaii*
Surface-to-Air Missile Exercise (SAMEX)*	PMRF, Kauai*; PMRF Warning Areas*
Air-to-Air Missile Exercise (AAMEX)*	PMRF, Kauai*; PMRF Warning Areas*
Air-to-Surface Missile Exercise (ASMEX)*	PMRF Warning Areas*
Surface-to-Surface Missile Exercise (SSMEX)*	PMRF, Kauai*; PMRF Warning Areas*
Anti-Submarine Warfare Exercise (ASWEX)*	PMRF and Oahu Warning Areas*; Open Ocean Areas*
Aerial Mining Exercise (MINEX)*	PMRF Warning Area*
Ship Mine Warfare Exercise (SMWEX)*	PMRF Mine Warfare Training Area*
Strike Warfare Exercise (STWEX), and Close Air Support Exercise (CASEX)*	PMRF, Kauai*; Kaula; PMRF Warning Areas; Pohakuloa Training Area, Hawaii*
Gunnery Exercise (GUNNEX)*	Kaula; PMRF Warning Areas*; Oahu Warning Areas*
Sinking Exercise (SINKEX)*	PMRF Warning Area W-188*
Live Fire Exercise (LFX)	Makua Military Reservation, Oahu; Pohakuloa Training Area, Hawaii
Humanitarian Assistance Operation/Non-combatant Evacuation Operation (HAO/NEO)	Marine Corps Base Hawaii, Oahu; Marine Corps Training Area Bellows / Bellows Air Force Station, Oahu; Kahuku Training Area, Oahu
Humanitarian Assistance/Disaster Relief (HA/DR)	Marine Corps Base Hawaii, Oahu; Marine Corps Training Area Bellows / Bellows Air Force Station, Oahu; Kahuku Training Area, Oahu
Special Warfare Operations (SPECWAROPS)*	PMRF, Kauai (R&S inserts, beach survey)*; PMRF Makaha Ridge (Down Pilot, R&S Inserts)*; PMRF, Port Allen*, Kauai (R&S, boat raid [Staging/Debarcation])*; Niihau (Down Pilot, R&S Inserts); Pearl Harbor/Ford Island (R&S inserts, harbor survey, ship attack; parachute operations, blank firing); Coast Guard Air Station Barbers Point/Kalaeloa Airport, Marine Corps Base Hawaii, Oahu, Hickam Air Force Base, Marine Corps Training Area Bellows / Bellows Air Station, Oahu, Kahuku Training Area, Oahu (R&S inserts); K-Pier, Hawaii, Bradshaw Army Airfield, Hawaii (R&S inserts, helicopter raid); Pohakuloa Training Area, Hawaii (R&S insert, in and outside of impact area); Makua Military Reservation, Oahu (R&S inserts, helicopter raid); Dillingham Military Reservation, Oahu (R&S inserts, snipers); Wheeler Army Airfield (R&S Inserts); Underwater Ranges; Oahu Warning Areas, PMRF Warning Areas; Open Ocean Areas.

Table 2: Proposed RIMPAC Exercises and Locations (Continued)

Exercise/Activity	Locations
Underwater Demolition Exercises (DEMO)*	PMRF and Oahu Warning Areas; Iroquois Land/Underwater Range, Pearl Harbor; Pu'uloa Underwater Range (outside of Pearl Harbor), Oahu*; PMRF, Kauai; Open Ocean Areas; Barbers Point Underwater Range (off-shore of Coast Guard Air Station Barbers Point)
Salvage Operations (SALVAGE OPS)*	Pearl Harbor, Oahu (MDSU-1 staging)*; Pu'uloa Underwater Range, Oahu*; Keehi Lagoon, Oahu*
Amphibious Exercise (AMPHIBEX)*	PMRF, Kauai*; Marine Corps Training Area Bellows/Bellows Air Force Station, Oahu*; Marine Corps Base Hawaii, Oahu*; K-Pier Kawaihae, Hawaii*
Submarine Operations (SUBOPS)*	PMRF and Oahu Warning Areas*; Open Ocean Areas*
Other Activities*	Transmitter Sites-Niihau, Molokai, Kauai, Oahu, Hawaii
	Boarding Exercises-Open Ocean Areas*

* Exercises and locations proposed for RIMPAC 02

MDSU-1 = U.S. Navy's Mobile Diving and Salvage Unit One

PMRF = Pacific Missile Range Facility

The alternative considered for the Proposed Action was a "no-action" alternative. Under the "no-action" alternative, future RIMPAC exercises would not be conducted. The individual exercises that are a part of existing training activities at the various installations in the Hawaiian Islands would continue. The potential impacts of the "no-action" alternative would be similar to those described for the Proposed Action. Thus, the ability of multinational forces to train, coordinate, and operate in simulated hostile scenarios would be lost, which would adversely impact military readiness. For this reason, the "no-action" alternative was rejected.

The PEA evaluates the potential environmental effects of RIMPAC exercises, location for various exercises including in-port operations, command and control, aircraft operations, ship maneuvers, amphibious landings, troop movements, missile exercises, submarine and antisubmarine exercises, mining and demolition activities, and salvage, special warfare and humanitarian operations.

The PEA addresses all reasonably foreseeable activities in the particular geographical areas affected by the Proposed Action and focuses on the activities with the greatest potential for impacts on the environment. Initial screening determined that because training exercises would take place at existing facilities and ranges routinely used for these types of activities, transportation and utilities would not be impacted and are not

included in the PEA. The environmental impact was analyzed for the following resource areas:

Air Quality – Exhaust emissions from targets, missiles and munitions fired from various land, sea and air platforms will be within applicable short-term guideline concentrations and will not significantly affect air quality.

Airspace – Use of rotary and fixed wing aircraft and missiles will be within special use airspace, such as Warning Areas and Restricted airspace. No new special use airspace proposal or any modification to the existing special use airspace is contemplated for the Proposed Action.

Biological Resources – Impacts to biological resources will not be significant. Potential impacts of exhaust emissions on terrestrial and marine biological resources are minimal. Natural Resource Management Plans have been prepared for land ranges to help identify and manage areas with sensitive habitat. Standard Operating Procedures and the RIMPAC Operation Order also include specific requirements for avoiding sensitive habitat areas. Established surveillance procedures will be followed to ensure marine mammals (whales or monk seals) or sea turtles are not present and to report any sightings.

Cultural Resources – Impacts to cultural resources are not anticipated since known sites will be avoided. Integrated Cultural Resource Management Plans and Standard Operating Procedures identify and outline methods for avoiding cultural resource areas. All training exercises are designed to avoid sensitive cultural areas. Ordnance impacts on land are limited to designated impact areas.

Geology and Soils – Potential impacts from missile exhaust emissions, amphibious landings, and the detonations of munitions and charges will not significantly affect the soils.

Hazardous Materials and Waste – No adverse impacts will result from hazardous materials used or hazardous waste generated during RIMPAC. Standard operating procedures for storage and disposal of these materials and wastes will be followed and will not result in any significant impacts.

Land Use – Only minor, temporary impacts will occur from closing various beaches to public use for several hours to accommodate the training requirements of some RIMPAC exercises. These

closings are normal, on-going occurrences at the various installations.

Noise - No significant impacts have been identified. Exercise areas are located away from sensitive receptors on existing installation and ranges designated for the proposed noise generating activity.

Safety and Health - Impacts to the health and safety of workers or the public are not expected. Specific safety plans are developed to ensure that each hazardous operation is in compliance with applicable policy and regulations and to ensure that the general public and range personnel and assets are provided an acceptable level of safety.

Socio-economics - RIMPAC exercises are considered to be positive socio-economic impact to the community. The sophisticated urban and tourist infrastructure of the Pearl Harbor and Honolulu area and the depth of experience in accommodating transient military personnel will combine to minimize any adverse impact of RIMPAC on the social infrastructure of the area.

Water Resources - All activities will be carried out in accordance with appropriate instructions and regulations, and the quality of surface and groundwater will not be adversely affected.

Based on the information gathered during preparation of the PEA, the Department of Defense finds that future RIMPAC exercises, including RIMPAC 2002, will not significantly impact the environment and therefore an EIS is not required.

Copies of the PEA and FONSI addressing this action are available by written request to: Commander in Chief, U.S. Pacific Fleet (N465), 251 Makalapa Drive, Pearl Harbor, HI 96860 (ATTN: Ms. Karen Verkennes).

These documents may also be reviewed at the following locations:

Wailuku Public Library
251 High Street
Wailuku, Hawaii 96793
(Maui)
(808) 243-5766

Hilo Public Library
300 Waianuenue Avenue
Hilo, Hawaii 96720
(Hawaii)
(808) 933-8888

Hawaii State Library
Hawaii and Pacific
Section Document Unit
478 South King Street
Honolulu, Hawaii 96813-2901
(Oahu)
(808) 586-3543

11 June 2022
Date

Lihue Public Library
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Lihue, Hawaii 96766
(Kauai)
(808) 241-3222



D. L. CRISP
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EXECUTIVE SUMMARY

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Introduction

Rim of the Pacific (RIMPAC) is a biennial, sea control/power projection fleet exercise that has been performed since 1968. The objective of the historically month-long exercise is to enhance the interoperability and proficiency of several nations' maritime and air forces to operate in coalition arrangements centered on realistic littoral (coastal) operations. RIMPAC would continue to involve forces from various Rim-of-the-Pacific nations. In the past, these nations have included Australia, Canada, Chile, Japan, the Republic of Korea, and the United States. United Kingdom, France, and Peru have been accepted to participate in RIMPAC 02, and others may be added in the future. Planning for a RIMPAC exercise begins 18 months before operations. RIMPAC would be typically conducted sometime between May and September.

The purpose of the Proposed Action is to implement a selected set of exercises that is combined into a multinational, sea control/power projection fleet training exercise in a multi-threat environment. RIMPAC exercises demonstrate the ability of a multinational force to communicate and operate in simulated hostile scenarios. This Environmental Assessment (EA) would allow the proponent to consider the environment when implementing the exercises that would make up future RIMPAC exercises. These future exercises would be coordinated and conducted in open-ocean, nearshore, and onshore environments where they are routinely conducted as individual exercises.

To fully ensure the operational effectiveness of multinational forces, the capability is needed to continue to provide the required training environment. The proposed uses of selected federal and private lands and nearshore and open-ocean areas would provide the capability to conduct this necessary training. RIMPAC is needed to enhance communication and cooperation between nations, to ensure the United States can accomplish shared operational objectives with other nations, to provide operational forces with battle-realistic training including live-fire, and to meet proficiency requirements designed to keep operational forces ready for use as directed by the operational force commander. It is the responsibility of the decisionmaker to determine if the analysis presented in this Programmatic EA would result in a Finding of No Significant Impact in accordance with the National Environmental Policy Act, or that preparation of an Environmental Impact Statement is required.

RIMPAC Activities

During initial planning meetings, the U.S. Navy Third Fleet solicits input from invited participants to understand the various testing and training needs. Range representatives consider these needs and assess the ability of ongoing testing and training exercises to accomplish them. Third Fleet operations personnel and range representatives work together to develop a general scenario to try to accommodate the testing and training needs. If existing exercises are not capable of providing the necessary testing and training,

consideration is given to alternative or new testing or training techniques. Third Fleet and identified participants meet as a planning group to further develop and refine the general scenario based on budget and time constraints as well as safety and environmental considerations. Requirements and the scenario are modified throughout the planning process as participants determine whether they will be able to provide the personnel and assets necessary to conduct the exercises envisioned early in the planning process. Accordingly, exercise planners remain flexible throughout the planning process to accommodate participants' changing needs and intentions based on real world events and budgets.

There are generally three planning conferences during the year leading up to RIMPAC. The result of planning is a final scenario where, typically, one country, "Green," is attacked by another country, "Orange." Green has requested and received support from the Pacific Rim nations. The allies then use military force to eliminate military hostilities and restore peace to the region. The military activities occurring during the exercise vary from year to year and are based on the participants' training needs and desires and may be based in part on anticipated operations that may be required under real world conditions.

RIMPAC consists of various phases of activity during the exercise period. Modification and rearrangement of the phases may occur depending on the exercise objectives. Table ES-1 shows a representative example of a RIMPAC Exercise. Allied forces opposing Orange are usually split into multinational and bilateral forces, depending on which Pacific Rim allies participate. The Multinational Force would be composed of units from various Rim-of-the-Pacific nations. In the past, these nations have included Australia, Canada, Chile, the Republic of Korea, and the United States. The Bilateral Force consists of units from Japan and the United States. As previously mentioned, the United Kingdom, France, and Peru have been accepted to participate in RIMPAC 02. The Multinational Force would have up to 9 days of briefings and preparations in Pearl Harbor. They would then move to various onshore, nearshore, and open-ocean areas for up to 21 days of workup training exercises including amphibious insertions, and covert reconnaissance, which includes up to 6 days of advanced weapon firings at the Pacific Missile Range Facility (PACMISRANFAC, herein PMRF) and the PMRF Warning Areas and underwater ranges.

The Bilateral Force would initially have up to 5 days of briefings at Pearl Harbor. Up to 11 days of workup exercises would then be conducted by the Bilateral Force at onshore, nearshore, and open-ocean areas. The Bilateral Force would then return to Pearl Harbor for up to an additional 6 days of briefings, and then conduct up to an additional 15 days of workup exercises. The workup exercises include up to 6 days of advanced weapon firings at PMRF and the PMRF Warning Areas and underwater ranges for an average total of 14 days, or a maximum of 26 days.

The next phase of RIMPAC would consist of up to 14 days of complex scenario-driven tactical exercises intended to represent real-life conflict situations. An amphibious landing assault of PMRF by allied forces would be the culmination of the scripted phase of exercises.

Table ES-1: RIMPAC Representative Schedule

Activity Average Exercise Days (Expanded Exercise Days)	Total Number of Average Exercise Days	Total Number of Expanded Exercise Days
Multinational Force arrives at Pearl Harbor Day 1 (Days 1-2)	1	2
Multinational Force In Port Briefings Days 1-6 (Days 1-9)	6	9
Bilateral Force Arrives at Pearl Harbor Day 1 (Days 1-2)	1	2
Bilateral Force in-port briefings Days 1-3 and 11-14 (Days 1-5 and 16-21)	7	11
Multinational Force Workup Exercises Days 7-20 (Days 15-36)	14	21
Bilateral Force workup exercises Days 3-10 and 15-20 (Days 5-15 and 22-36)	14	28
Tactical Scenario Exercises Days 20-29 (Days 36-49)	10	14
Amphibious Landing Exercises Days 23 and 29 (Days 34-35 and 45-49)	2	4
Amphibious back-load Days 24 and 30 (Days 35-36 and 49-50)	2	4
Bilateral Force returns to Pearl Harbor Days 29-30 (Days 49-52)	2	4
Multinational Force returns to Pearl Harbor Days 29-30 (Days 49-52)	2	4
Post Exercise Activities Days 30-32 (Days 52-56)	3	5
Dispersal Day 33 (Days 56-57)	1	2

Post-exercise briefings for all forces would be conducted at Pearl Harbor following completion of all scheduled exercises. A reception and numerous athletic events for participating forces would also be held at that time. In 1998, 56 ships, 8 submarines, 220 aircraft, and 27,100 personnel participated in RIMPAC exercises. In 2000, 46 ships, 7 submarines, 200 aircraft, and 22,000 personnel participated in RIMPAC exercises.

In 2002, an estimated 33 ships, 5 submarines, 52 aircraft, and 10,600 personnel will participate in RIMPAC exercises. For purposes of analyzing future RIMPAC exercises, ship, aircraft, and personnel loadings will be used that represent the anticipated Maximum participation (table ES-2). The Maximum RIMPAC exercise would include two or more Carrier Battle Groups, a Marine Expeditionary Brigade, a Marine Expeditionary Unit, and an Opposing Force.

Table ES-2: Typical Loadings for a RIMPAC Exercise

Forces	Ships	Submarines	Aircraft	Staff
Bilateral Force	11	1	65	6,500
Multinational Force	20	2	85	12,000
Commander Combined Task Force	6	0	23	1,400
Opposing Force	9	4	27	2,100
Typical	Total 46	7	200	22,000
Minimum	20	1	24	8,000
Maximum	60	10	260	30,000

Under the Minimum participation scenario, it is assumed that no carrier battle group would be able to attend and that there would be less than a full Amphibious Task Force. Although relatively small compared to the typical exercise scenario, the Minimum loading would still be sufficient to conduct a RIMPAC exercise.

Methodology

This Programmatic EA identifies the Proposed Action as the set of exercises and locations that could be used for future RIMPAC activities (possibly five or more exercises), and describes the existing environment at the locations where the exercises could occur. The Programmatic EA evaluates the potential environmental effects of RIMPAC exercises at each location. Impacts could result from activities at onshore, nearshore, and open-ocean areas. Activities associated with the Proposed Action include in-port operations, aircraft operations, ship maneuvers, amphibious landings, troop movements, missile exercises, live fire exercises, submarine and antisubmarine exercises, mining and demolition activities, humanitarian assistance exercises, special warfare operations and salvage operations.

This Programmatic EA addresses the reasonably foreseeable activities in the particular geographical areas affected by the Proposed Action and focuses on the activities with the greatest potential for impacts to the environment. Activities would use existing facilities and/or be conducted in existing training areas designated for the particular type of training and testing involved, or in areas where appropriate arrangements have been made for the use of the real estate.

Consistent with Council on Environmental Quality regulations, the scope of the analysis presented in this Programmatic EA was defined by the range of potential environmental impacts that could result from implementation of the Proposed Action and No-action Alternative. For the Programmatic EA analysis, the environment was initially considered in terms of 13 resource areas: air quality, airspace, biological resources, cultural resources, geology and soils, hazardous materials and waste, land use, noise, safety and health, socioeconomics, transportation, utilities, and water resources. Only those resources that have a potential for impacts were included in the Programmatic EA analysis to provide the decisionmaker with sufficient evidence and analysis for evaluation of the potential effects of

the action. Initial screening determined that because training exercises would take place at existing facilities and ranges routinely used for these types of activities, transportation and utilities would not be impacted and are not included in this Programmatic EA. Ocean areas outside territorial waters were addressed in conformance with Executive Order 12114, *Environmental Effects Abroad of Major Federal Actions*.

The exercises planned for RIMPAC as defined by the individual RIMPAC exercise Operations Order (OPORDER) become the Proposed Action (table ES-3). The Proposed Action is a range of exercise durations as stated under each exercise. Future RIMPAC exercises would involve elements ranging from 20 to 60 ships, 1 to 10 submarines, 24 to 260 aircraft, and 8,000 to 30,000 military personnel.

Results

Air Quality

PMRF, Kauai—For nominal launch conditions, this analysis indicated no potential for exceeding applicable short-term guideline concentrations. Due to the altitude at which it operates and the mobile nature of the emitter, the ramjet is not expected to impact ambient air quality. No air quality impacts are anticipated due to the continued use of the ground hazard area for launches.

The launch of the air-to-air, air-to-surface, and surface-to-air weapon systems would occur over the open water and would not affect local air quality.

Airspace

PMRF, Kauai—No new special use airspace proposal or any modification to the existing special use airspace is contemplated to accommodate RIMPAC activities at PMRF. An airship may be deployed at PMRF and would comply with all Federal Aviation Administration (FAA) flight regulations. Consequently, no impacts to the airspace at PMRF would result from RIMPAC activities.

Kaula—No new special use airspace proposal or any modification to the existing special use airspace is contemplated to accommodate continuing mission activities. Consequently, no impacts to the airspace over Kaula would result from RIMPAC activities.

Pearl Harbor, Oahu—An airship may be deployed at Ford Island. The airship would comply with all FAA regulations for flight execution; thus, adverse impacts to Pearl Harbor airspace would not be anticipated.

Coast Guard Air Station Barbers Point/Kalaheo Airport, Oahu—An airship may be deployed at Coast Guard Air Station Barbers Point in order to support and monitor several RIMPAC exercises. The airship has two engines and operates under FAA rules for powered flight. No impacts are anticipated to airspace.

Marine Corps Base Hawaii, Oahu—No use of controlled airspace is planned for RIMPAC exercises other than localized use of rotary wing and fixed-wing aircraft within predefined areas. No impact to airspace has been identified.

Hickam Air Force Base, Oahu—All air operations (AIROPS) activities for RIMPAC exercises at Hickam Air Force Base are consistent with ongoing, daily activities; thus, no airspace impacts are anticipated.

Marine Corps Training Area Bellows/Bellows Air Force Station, Oahu—No impact to airspace has been identified.

Kahuku Training Area, Oahu—No impact to airspace has been identified.

Makua Military Reservation, Oahu—No impact to airspace has been identified.

Dillingham Military Reservation, Oahu—Activities entail no use of controlled airspace other than localized use of rotary wing aircraft within predefined areas for reconnaissance and survey inserts. No impact to airspace has been identified.

Bradshaw Army Airfield, Hawaii—No impact to airspace has been identified. Aircraft would be operated within predefined areas.

Pohakuloa Training Area, Hawaii—Air-to-surface missile training occurs routinely at the Pohakuloa Training Area and is confined to the special use airspace. No effects on airspace resulting from RIMPAC have been identified.

Open Ocean Areas—Air-to-surface missile training occurs routinely within the Hawaiian operating area and is confined to Restricted Areas and Warning Areas under the control of PMRF and Fleet Area Control and Surveillance Facility Pearl Harbor. No new special use airspace proposal or any modification to the existing special use airspace is contemplated to accommodate continuing mission activities. Consequently, no new impacts to the airspace are expected.

Biological Resources

PMRF, Kauai—Reconnaissance and survey inserts (also at Makaha Ridge) and an underwater mine/obstruction survey at PMRF are planned. Existing cleared areas, trails, and roads would be utilized. Due to the non-intrusive nature of these activities, no impact to biological resources is anticipated. The potential impacts of target (Surface-to-Air Missile Exercise, Air-to-Air Missile Exercise, and Surface-to-Surface Missile Exercise) launching activities on biological resources are minimal.

The potential for an object or objects dropping from the air to affect marine mammals (whales or monk seals), sea turtles, or other marine biological resources is less than 10^{-6} (1 in 1 million), and it is highly unlikely that marine mammals would be impacted during Ship

Mine Warfare exercises. The impacts of AIROPS on biological resources would be minor and insignificant.

Currently there are no known Essential Fish Habitat areas at PMRF that would be impacted by RIMPAC.

The care taken to assure a clear area of operation before detonation, the procedures implemented in charge placement, and the infrequent occurrence of these detonations all lead to a minimal impact on marine biological resources in the area and make it unlikely that marine mammals would be directly impacted. The adjacent area would be searched after the exercises for any injured animals.

Impacts to the live coral coverage from tracked vehicles have not been found to be significant in previous studies, and are minimized by use of regular transit routes through sandy bottom areas. Amphibious vehicles are unlikely to adversely affect endangered or threatened species, such as humpback whales or green sea turtles. Crews are well-trained and follow established procedures, such as having a designated lookout watching for other vessels, obstructions to navigation, marine mammals (whales or monk seals), or sea turtles. The beach and offshore waters would be monitored for the presence of marine mammals and sea turtles 1 hour before and during RIMPAC exercises. If any are seen, the exercise would be delayed until the animals leave the area. No impacts on marine biota or threatened or endangered species from RIMPAC exercises are expected. Training activities are of short duration, however, and are not expected to adversely affect the areas where the birds are most likely to nest. Soldiers training on foot are not expected to adversely affect vegetation or wildlife in the beach landing areas, since birds and grazing animals have already facilitated the transport of seeds of exotic and noxious vegetation.

Niihau—Special Warfare Operations (SPECWAROPS) exercises on Niihau would utilize existing openings, trails and roads. Therefore, no impacts to biological resources would be anticipated.

Kaula—RIMPAC is not planned to occur during the whale season of September through May. Individual migratory seabirds may be lost due to the use of inert munitions in the designated impact area; however, the impacts on the populations of these species would be expected to be minimal.

Pearl Harbor, Oahu—RIMPAC exercises have procedures and practices in place to prevent the introduction of invasive species, Executive Order 13112, to Pearl Harbor. The RIMPAC OORDER annex for environmental protection outlines procedures for marine mammal collision avoidance and encounter reporting. Therefore, no impact to biological resources is anticipated.

Iroquois Land/Underwater Range, Oahu—RIMPAC exercises have procedures and practices in place to prevent the introduction of invasive species, per Executive Order 13112, to the Iroquois Land/Underwater Range. The RIMPAC OORDER annex for environmental

protection outlines procedures for collision avoidance and encounter reporting. The care taken to assure a clear area of operation before detonation, the procedures implemented in charge placement, and the infrequent occurrence of these detonations all lead to a minimal impact on marine biological resources in the area and make it unlikely that marine mammals would be directly impacted. The adjacent area would be searched after the exercises for any injured animals. Therefore, no impact to biological resources is anticipated.

Pu'uloa Underwater Range, Oahu—The care taken to assure a clear area of operation prior to detonation, the procedures implemented in charge placement, and the infrequent occurrence of these detonations all lead to a minimal impact on biological resources in the area. The adjacent area would be searched after the exercises for any injured animals.

Barbers Point Underwater Range, Oahu—The care taken to assure a clear area of operation before detonation, the procedures implemented in charge placement, and the infrequent occurrence of these detonations all lead to a minimal impact on marine biological resources in the area and make it unlikely that marine mammals would be directly impacted. The adjacent area would be searched after the exercises for any injured animals.

Coast Guard Air Station Barbers Point/Kalaheo Airport, Oahu—SPECWAROPS would utilize existing facilities, concrete aprons, hangars, and adjacent open areas for various activities. Due to the non-intrusive nature of these activities, potential impacts to biological resources are not anticipated.

Marine Corps Base Hawaii, Oahu—The appropriate vehicle or craft would be matched to the selected landing site to minimize potential impacts to exposed reefs and coral. The beach and offshore waters would be monitored for the presence of marine mammals and sea turtles 1 hour before and during RIMPAC exercises. If any are seen, the exercise would be delayed until the animals leave the area. The current operating restrictions result in minimal impact to the environment and avoid any impacts to threatened or endangered species. Pre-exercise beach surveys would be conducted to identify any sea turtle nests. If present, these sites would be avoided.

Hickam Air Force Base, Oahu—SPECWAROPS and salvage operations activities would be staged out of existing facilities at Hickam Air Force Base. No impacts to biological resources are anticipated.

Marine Corps Training Area Bellows/Bellows Air Force Station, Oahu—Impacts to the live coral coverage from tracked vehicles have not been found to be significant in previous studies, and are minimized by use of regular transit routes through sandy bottom areas. Amphibious vehicles are unlikely to adversely affect endangered or threatened species, such as humpback whales or green sea turtles. Crews are well-trained and follow established procedures, such as having a designated lookout watching for other vessels, obstructions to navigation, marine mammals (whales or monk seals), or sea turtles. The beach and offshore waters would be monitored for the presence of marine mammals and sea turtles 1 hour before and during RIMPAC exercises. If any are seen, the exercise would be delayed until the animals leave the area. No impacts on marine biota or

threatened or endangered species from RIMPAC exercises are expected. Training activities are of short duration, however, and are not expected to adversely affect the areas where the birds are most likely to nest. Soldiers training on foot are not expected to adversely affect vegetation or wildlife in the beach landing areas, since birds and grazing animals have already facilitated the transport of seeds of exotic and noxious vegetation.

Kahuku Training Area, Oahu—All planned operations are non-intrusive in nature. All participants would follow training guidelines. No impacts to biological resources due to proposed RIMPAC activities in the Kahuku Training Area.

Makua Military Reservation, Oahu—The standard operating procedure for Makua Military Reservation restricts exercise activities to areas that are outside of sensitive habitat. No impact to threatened and endangered species is anticipated.

Dillingham Military Reservation, Oahu—No impacts to biological resources are anticipated due to the limited number of participants, the non-intrusive nature of these activities, and the adherence of all participants to the training guidelines.

Wheeler Army Airfield, Oahu—Operations would utilize existing facilities and open areas; therefore, no impacts to biological species have been identified.

K-Pier, Hawaii—The amphibious landing ship would follow existing procedures for entering the harbor and unloading equipment and supplies at the boat ramp. Therefore, no impact to biological resources is anticipated.

Bradshaw Army Airfield, Hawaii—Activities are limited in scope and non-invasive in nature and would not impact the areas beyond the airfield itself. Adherence to current guidelines would further limit the potential for introduction of weed plant species as well as reduce any incipient risk of fire or damage due to training activities.

Pohakuloa Training Area, Hawaii—The impacts of air-to-surface missile and live fire exercise training on biological resources in existing live fire impact areas would not be significant.

Open Ocean Areas—The lack of an explosive charge, the required clearance, and conducting the majority of gunnery runs at the controlled ranges at PMRF keep the risk to whales, monk seals, or sea turtles remote. Ordnance cannot be released until the range is determined clear. Operations are immediately halted if whales, monk seals, or sea turtles are observed within the range. Operations are delayed until the animal clears the area. All observers are in continuous communication in order to have the capability to immediately stop the operations. The exercise can be modified as necessary to obtain a clear range, or it is canceled. All of these factors serve to avoid the risk of harming whales, monk seals, or sea turtles. The potential for any harm to marine mammals (whales or monk seals) or sea turtles from targets or the expended ship missiles is remote. Location of buoy drops, visual search, and the slow rate of descent dramatically reduce the possibility of either

injuring or having any effect on whales, monk seals, or sea turtles. The very low power of the battery-driven active sonobuoy ensures that the likelihood of injury to whales, monk seals, or sea turtles from the sonar is small. The only potential effect would be for the whales, monk seals, or sea turtles to detect this low power pulsed signal and avoid it. The firing and tracking of non-explosive torpedoes in existing submarine operations training areas would not result in any significant adverse impacts to biological resources.

Keehi Lagoon, Oahu—Removal of old sunken barges from the lagoon would eliminate artificial habitat for some marine organisms. The impacts to biological resources are considered minor and insignificant.

Cultural Resources

PMRF, Kauai—Due to the implementation of the appropriate monitoring, consultations with State Historic Preservation Officer, Hawaii, and by following the U.S. Navy and PMRF's Cultural Resources Management Plan, impacts to cultural resources at PMRF are not anticipated.

Niihau—No known traditional cultural properties are located within the U.S. Navy's Mobile Operations Area on Niihau. Exercise participants would be briefed on the need to promptly notify Navy Region personnel if any cultural resources are found so appropriate coordination could be initiated.

Kaula—Due to the absence of identified cultural resources sites within the impact area on Kaula, no cultural impacts are anticipated.

Marine Corps Base Hawaii, Oahu—No known archaeological or historical sites are located within the RIMPAC operational areas; thus, no impacts are anticipated.

Hickam Air Force Base, Oahu—AIROPS and SPECWAROPS activities would be staged out of existing facilities at Hickam Air Force Base. None of these activities would impact known cultural resources.

Marine Corps Training Area Bellows/Bellows Air Force Station, Oahu—Since the beach and adjacent areas to be utilized by RIMPAC activities are also heavily utilized by the public for recreation, potential impacts to previously unknown cultural resources are not expected. Known cultural resource sites would be avoided; thus, no impacts are anticipated.

Kahuku Training Area, Oahu—All personnel entering the Kahuku Training Area would adhere to current training guidelines. Therefore, no impacts to cultural resources within the Kahuku Training Area are anticipated.

Makua Military Reservation, Oahu—The standard operating procedure for Pilila'au Range, Makua Military Reservation live fire exercises is designed to avoid cultural resources; thus, no impacts are anticipated.

Dillingham Military Reservation, Oahu—All personnel entering the Dillingham Military Reservation would adhere to the training guidelines regarding cultural resources. Therefore, no impacts to cultural resources within the Dillingham Military Reservation are anticipated.

Bradshaw Army Airfield, Hawaii—No archaeological sites have been identified in the area; therefore, no impacts are anticipated.

Pohakuloa Training Area, Hawaii—Air-to-surface missile training and live fire exercises at Pohakuloa Training Area would be confined to the impact area, where no known sites exist. Therefore, impacts of RIMPAC exercises on cultural resources are not anticipated.

Geology and Soils

PMRF, Kauai—Potential impacts from missile launches, amphibious landings, and demolition exercises (DEMO) are expected to be short-term and minor.

Hazardous Materials and Waste

PMRF, Kauai—No adverse impacts are anticipated. Solid and liquid propellant missiles during launch activities at PMRF, including any potential mishaps, have been previously analyzed and determined not to result in any significant impacts to the environment.

Land Use

PMRF, Kauai—Proposed RIMPAC activities have been determined to be compatible with current land uses. No impacts to land use on PMRF or adjacent to the installation are anticipated. Additional impacts to recreational uses and subsistence fishing from RIMPAC activities are not expected, since PMRF restricts access by the public to PMRF beach and water areas on an on-going basis.

Pu'uloa Underwater Range, Hawaii—Use of the range for DEMO activities should not result in closure of Ewa Beach for recreational activities by the public since Ewa Beach is located outside the safety clearance zone. Aquaculture farming would not be impacted by DEMO activities at the range.

Barbers Point Underwater Range, Oahu—The activity would not result in environmental impacts because the DEMO and SPECWAROPS activities are short in duration. The beach area would be temporarily closed to the public during RIMPAC exercises. The recreation opportunities offered at the shoreline are not unique, and can be satisfied at any number of different beach settings within the island.

Marine Corps Training Area Bellows/Bellows Air Force Station, Oahu—Use of the beach and adjacent areas at Bellows Air Force Station by RIMPAC activities would not change or alter on-base or off-base land use patterns. Beach closures on weekends would be kept to the minimum time needed to conduct the exercises and ensure the public is properly protected.

K-Pier, Kawaihae, Hawaii—Off-loading and back-loading of military personnel, equipment, and supplies have the potential to impact access via the north gate to the Pua Ka'ilima Okawaihae Cultural Surf Park. Access to the park via the south gate would not be impacted. A temporary or permanent recycling washrack would be sited on lands already controlled by the military. Overall, the impacts from RIMPAC exercises at K-Pier would be minor and insignificant.

Noise

PMRF, Kauai—Small arms fire, using blank ammunition during the beach assault, would produce minor, short-term increases in ambient noise levels that cannot be avoided.

Marine Corps Base Hawaii, Oahu—Noise impacts would be mitigated by public notification and restricting landing craft, air-cushion in the bay to daylight hours. No significant impact would be anticipated due to RIMPAC activities.

Marine Corps Training Area Bellows/Bellows Air Force Station, Oahu—The results of noise studies performed during amphibious training exercises indicate the Proposed Action would not exceed noise thresholds in any off-base areas. Thus, no impacts are anticipated.

Makua Military Reservation, Oahu—Due to the minor nature of the RIMPAC exercises at Makua, no noise impacts have been identified.

Pohakuloa Training Area, Hawaii—The impact area is in an isolated area away from residential land uses. There are no known sensitive receptors within 8 kilometers (5 miles). Therefore, noise impacts are not anticipated.

Safety and Health

PMRF, Kauai—The potential for adverse safety and health impacts from RIMPAC exercises would be low due to existing standard operating procedures. Transportation accidents are unlikely on Kauai given the in-place safety procedures used by PMRF during pre-launch activities. All potentially hazardous debris resulting from an accident during a launch activity would be contained entirely within the explosive safety quantity-distance, which would already have been cleared of unprotected personnel. At no time are individuals of the public exposed to a probability of fatality greater than 1 in 10 million for any single mission and 1 in 1 million on an annual basis. Thus, adverse impacts are not anticipated.

Kaula—To minimize health and safety risks, the U.S. Navy has established a Surface Danger Zone around Kaula and has closed the island and surrounding tidal zone to unauthorized personnel. Thus, adverse impacts are not anticipated.

Pu'uloa Underwater Range, Oahu—The range is located well offshore and the activities would not impact utilization of public beaches; therefore no impacts to safety and health from RIMPAC activities are anticipated.

Barbers Point Underwater Range, Oahu—Prior to any explosive being detonated, divers and U.S. Navy marine mammals are transported a safe distance away from the explosive and a thorough search is made of the area for unauthorized personnel and vessels. No impacts to safety and health from RIMPAC activities are anticipated.

Makua Military Reservation, Oahu—Live fire training occurs routinely at Makua Military Reservation. Specific safety plans have been developed to ensure that each hazardous operation is in compliance with applicable policy and regulations and to ensure that the general public and range personnel and assets are provided an acceptable level of safety. Thus, no impacts are anticipated.

Pohakuloa Training Area, Hawaii—Pohakuloa Training Area Safety Office establishes criteria for the safe execution of training activities in the form of Range Safety Approval and Range Safety Operational Plan documents, which are required for all weapon and target systems using Pohakuloa Training Area. The impact area is in an isolated area with restricted access located away from the civilian population. Impacts on safety and health are not anticipated.

Open Ocean Areas—All PMRF and Fleet Area Control and Surveillance Facility controlled fleet training activities that occur over the open water would continue to be conducted in Warning Areas and Restricted Airspace. Before any operation is allowed to proceed, the overwater range is determined cleared using inputs from ship sensors, visual surveillance of the range from aircraft and range safety boats, radar data, and acoustic. In addition, prior to conducting any training on PMRF, the operation must obtain PMRF safety approval before proceeding. Risk is reduced by providing termination systems on some of the missiles and by determining that the area—based on the distance the system can travel for those missiles without flight termination (typical air-to-air missile)—is clear. The impacts of missile training exercises on safety and health are not expected to be different for RIMPAC training than for routine training activities customarily conducted in the open water training areas.

Socioeconomics

Pearl Harbor, Oahu—Expenditure by transient military personnel and the purchase of goods and services to support the in-port program would have a positive direct effect on the local economy. An estimated \$19.8 million of direct income would be generated.

Keehi Lagoon, Oahu—The removal of old sunken barges in Keehi Lagoon would have a positive impact on commercial seaplane navigation and water recreational activities.

Water Resources

PMRF, Kauai—Liquid fuel exhaust products (water vapor, nitrogen gas, and carbon monoxide) would have no impact on surface or groundwater. The analysis also considered solid fuel exhaust products and concluded that hydrogen chloride emissions would not significantly affect the chemical composition of surface or groundwater; that there would be no significant increase in aluminum oxide in surface waters due to launches; that

sampling of surface waters in the vicinity of the launch site showed that hydrogen chloride, potentially deposited during past launches, has not affected surface water quality on PMRF or adjacent areas; that contamination from spills of toxic materials would be highly unlikely; and that no significant effects on marine or freshwater due to solid fuel debris are expected. Impacts to beach and water areas from wastewater or tar balls have not been reported at PMRF.

Kaula—No impacts to water resources are anticipated due to the lack of surface water and groundwater resources on the island.

Pohakuloa Training Area, Hawaii—The missile and live fire exercise impacts would not result in adverse effects on water resources in the vicinity.


Open Ocean Areas—The National Aeronautics and Space Administration conducted a thorough evaluation of the effects of missile systems that are deposited in seawater. It concluded that the release of hazardous materials aboard missiles into seawater would not be significant. Any area affected by the slow dissolution of the propellant would be relatively small due to the size of the target drone motor and/or missile propellant pieces relative to the quantity of seawater. Thus, adverse impacts are not anticipated.

Table ES-3: Proposed Action Locations and Exercises

Service	Location	Island	IN-PORT/ SUPPORTEX	C2	AIOPS	SAMEX	AAMEX	ASMEX	SSMEX	ASWEX	MINEX	SMWEX	STWEX, CASEX	GUNNEX	SINKEX	LFX	HAO/NEO	HA/DR	SPECWAROPS	DEMO	SALVAGE OPS	AMPHIBEX	SUBOPS
U.S. Navy	Pacific Missile Range Facility *	Kauai		02	02	02	02		02			02	02						02 *			02	
	Niihau	Niihau																					
	Kaula	Kaula																					
	Pearl Harbor **	Oahu	02	02	02																02		
	Iroquois Land/Underwater Range																						
	Pu'uloa Underwater Range – Pearl Harbor	Oahu																		02	02		
	Barbers Point Underwater Range	Oahu																					
	Coast Guard Air Station Barbers Point/ Kalaheo Airport	Oahu																					
	PMRF Warning Areas	Ocean Areas				02	02	02	02	02	02			02	02								02
	Oahu Warning Areas	Ocean Areas								02				02									02
	Open Ocean Areas	Ocean Areas								02													02
	US Command Ship	Ocean Areas																					
U.S. Marines	Marine Corps Base Hawaii	Oahu		02	02																	02	
U.S. Air Force	Hickam Air Force Base	Oahu			02																		
	Marine Corps Training Area/ Bellows Air Force Station	Oahu																				02	
U.S. Army	Kahuku Training Area	Oahu																					
	Makua Military Reservation	Oahu																					
	Dillingham Military Reservation	Oahu																					
	Wheeler Army Airfield	Oahu																					
	K-Pier, Kawaihae	Hawaii																				02	
	Bradshaw Army Airfield	Hawaii			02																		
	Pohakuloa Training Area	Hawaii		02									02										
State	Keehi Lagoon	Oahu																			02		

* Includes Port Allen and Makaha Ridge

** Includes Ford Island and all other areas within the harbor.

 Proposed exercise locations

 Proposed RIMPAC 02 exercise locations

Exercise Types:

AAMEX = Air-to-Air Missile Exercise
 AIOPS = Aircraft Operations
 AMPHIBEX = Amphibious Landing Exercise

GUNNEX = Gunnery Exercise
 HA/DR = Humanitarian Assistance/Disaster Relief
 HAO/NEO = Humanitarian Assistance Operation/
 Non-combatant Evacuation Operation

SINKEX = Sinking Exercise
 SMWEX = Ship Mine Warfare Exercise
 SPECWAROPS = Special Warfare Operations

ASMEX = Air-to-Surface Missile Exercise
 ASWEX = Anti-submarine Warfare Exercise
 CASEX = Close Air Support
 C2 = Command and Control
 DEMO = Demolition Exercise

IN-PORT = In-port Briefings and Activities
 LFX = Live Fire Exercise
 MINEX = Aerial Mining Exercise
 SALVAGE OPS = Salvage Operations
 SAMEX = Surface-to-Air Missile Exercise

SSMEX = Surface-to-Surface Missile Exercise
 STWEX = Strike Warfare Exercise
 SUBOPS = Submarine Operations
 SUPPORTEX = In-port Support Exercise

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ACRONYMS AND ABBREVIATIONS

ACRONYMS AND ABBREVIATIONS

AAV	Assault Amphibian Vehicle
AAMEX	Air-to-Air Missile Exercise
AICUZ	Air Installation Compatible Use Zone
AIROPS	Aircraft Operations Support
AMPHIBEX	Amphibious Exercise
ARTCC	Air Route Traffic Control Center
ASMEX	Air-to-Surface Missile Exercise
ASWEX	Anti-Submarine Warfare Exercise
ATF	Amphibious Task Force
BARSTUR	Barking Sands Tactical Underwater Range
BSURE	Barking Sands Underwater Range Expansion
C2	Command and Control
C ³	Command, Control, and Communications
CASEX	Close Air Support
CFR	Code of Federal Regulations
CHRIMP	Consolidated Hazardous Materials Reutilization and Inventory Management Program
CINCPACFLT	Commander in Chief U.S. Pacific Fleet
COMNAVREG HI	Commander, Navy Region Hawaii
COMNAVSURFPAC	Commander, Naval Surface Forces Pacific
COMTHIRDFLT	Commander Third Fleet
CRRC	Combat Rubber Reconnaissance Craft
CSAR	Combat Search and Rescue
DA	Direct Action
dBA	A-weighted decibel
DEMO	Demolition Exercise
DNL	Day-Night Level

DoD	U.S. Department of Defense
DOE	U.S. Department of Energy
DOT	U.S. Department of Transportation
EA	Environmental Assessment
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
EO	Executive Order
EPA	Environmental Protection Agency
ESQD	Explosive Safety Quantity-Distance
FAA	Federal Aviation Administration
FACSFACPH	Fleet Area Control and Surveillance Facility Pearl Harbor
GUNNEX	Gunnery Exercise
HA/DR	Humanitarian Assistance/Disaster Relief
HAO/NEO	Humanitarian Assistance Operation/Non-combatant Evacuation Operation
HAPC	Habitat Area of Particular Concern
HARM	High-speed Anti-radiation Missile
HARMEX	HARM Exercise
HARPOONEX	Harpoon Exercise
HYDROPAC	warning message to mariners in the Pacific Ocean
ICAO	International Civil Aviation Organization
IN-PORT	In-Port Activities
ISTT	Improved Surface Towed Target
K-Pier	Kawaihae Pier
KTF	Kauai Test Facility
LCAC	Landing Craft, Air-cushion
LCU	Landing Craft, Utility
L _{eq}	Continuous Equivalent Sound Level
LFA	Low Frequency Active

LFX	Live Fire Exercise
MDSU-1	Mobile Diving and Salvage Unit One
MINEX	Mining Exercise
NAS	Naval Air Station
NEPA	National Environmental Policy Act
NGFSS	Naval Gunfire Scoring System
NOTAM	Notice to Airmen
NOTMAR	Notice to Mariners
NRHP	National Register of Historic Places
Onset-TTS	Onset of Temporary Threshold Shift
OPNAVINST	Naval Operations Instruction
OPORDER	Operations Order
PENGUINEX	Penguin Exercise
PMRF	Pacific Missile Range Facility
POL	Petroleum, oil, and lubricants
R&S	Reconnaissance and Surveillance
RCC	Range Commanders Council
RHIB	Rigid Hull, Inflatable Boat
RIMPAC	Rim of the Pacific
SAMEX	Surface-to-Air Missile Exercise
SEPTAR	Seaborne Powered Target
SHPO	State Historic Preservation Officer
SINKEX	Sinking Exercise
SMWEX	Ship Mine Warfare Exercise
SPECWAROPS	Special Warfare Operations
SR	Special Reconnaissance
SSMEX	Surface-to-Surface Missile Exercise
STWEX	Strike Warfare Exercise
SUBOPS	Submarine Operations

SUPPORTEX	Support Exercise
SURTASS	Surveillance Towed Array Sensor System
TRAP	Tactical Recovery of Aircraft and Personnel
USFWS	United States Fish and Wildlife Service

CONTENTS

CONTENTS

EXECUTIVE SUMMARY	ES-1
ACRONYMS AND ABBREVIATIONS	
1.0 PURPOSE AND NEED	1-1
1.1 BACKGROUND	1-1
1.2 PURPOSE OF AND NEED FOR THE PROPOSED ACTION	1-2
1.3 DECISIONS TO BE MADE.....	1-2
1.4 SCOPE OF THIS PROGRAMMATIC ENVIRONMENTAL ASSESSMENT	1-3
1.5 SCOPE OF FUTURE ENVIRONMENTAL REVIEWS	1-3
2.0 DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES	2-1
2.1 DESCRIPTION OF THE RIMPAC EXERCISE	2-1
2.2 DESCRIPTION OF TESTING AND TRAINING EXERCISES PROPOSED FOR RIMPAC.....	2-4
2.2.1 IN-PORT ACTIVITIES (IN-PORT), SUPPORT ACTIVITIES (SUPPORTEX)	2-4
2.2.2 COMMAND AND CONTROL (C2)	2-9
2.2.3 AIRCRAFT OPERATIONS SUPPORT (AIROPS)	2-9
2.2.4 SURFACE-TO-AIR MISSILE EXERCISE (SAMEX).....	2-14
2.2.5 AIR-TO-AIR MISSILE EXERCISE (AAMEX)	2-16
2.2.6 AIR-TO-SURFACE MISSILE EXERCISE (ASMEX).....	2-18
2.2.7 SURFACE-TO-SURFACE MISSILE EXERCISE (SSMEX)	2-19
2.2.8 ANTI-SUBMARINE WARFARE EXERCISE (ASWEX)	2-20
2.2.9 AERIAL AND SUBMARINE MINING EXERCISE (MINEX).....	2-21
2.2.10 SHIP MINE WARFARE EXERCISE (SMWEX)	2-22
2.2.11 STRIKE WARFARE EXERCISE (STWEX) AND CLOSE AIR SUPPORT EXERCISE (CASEX)	2-23
2.2.12 GUNNERY EXERCISE (GUNNEX).....	2-24
2.2.13 SINKING EXERCISE (SINKEX)	2-24
2.2.14 LIVE FIRE EXERCISE (LFX)	2-25
2.2.15 HUMANITARIAN ASSISTANCE OPERATION/NON- COMBATANT EVACUATION OPERATION (HAO/NEO)	2-26
2.2.16 HUMANITARIAN ASSISTANCE/DISASTER RELIEF (HA/DR)	2-28
2.2.17 SPECIAL WARFARE OPERATIONS (SPECWAROPS)	2-31
2.2.18 UNDERWATER DEMOLITION EXERCISES (DEMO).....	2-32
2.2.19 SALVAGE OPS.....	2-33
2.2.20 AMPHIBIOUS EXERCISE (AMPHIBEX).....	2-37
2.2.21 SUBMARINE OPERATIONS (SUBOPS)	2-40
2.2.22 OTHER ACTIVITIES	2-40
2.3 PROPOSED ACTION.....	2-43
2.4 NO-ACTION ALTERNATIVE.....	2-43
2.5 ALTERNATIVES CONSIDERED BUT NOT CARRIED FORWARD.....	2-43

3.0	AFFECTED ENVIRONMENT	3-1
3.1	PACIFIC MISSILE RANGE FACILITY, KAUAI	3-1
3.1.1	AIR QUALITY—PACIFIC MISSILE RANGE FACILITY, KAUAI	3-3
3.1.2	AIRSPACE—PACIFIC MISSILE RANGE FACILITY, KAUAI	3-4
3.1.3	BIOLOGICAL RESOURCES—PACIFIC MISSILE RANGE FACILITY, KAUAI	3-4
3.1.4	CULTURAL RESOURCES—PACIFIC MISSILE RANGE FACILITY, KAUAI	3-9
3.1.5	GEOLOGY AND SOILS—PACIFIC MISSILE RANGE FACILITY, KAUAI	3-9
3.1.6	HAZARDOUS MATERIALS AND WASTE—PACIFIC MISSILE RANGE FACILITY, KAUAI	3-10
3.1.7	LAND USE—PACIFIC MISSILE RANGE FACILITY, KAUAI	3-11
3.1.8	NOISE—PACIFIC MISSILE RANGE FACILITY, KAUAI	3-11
3.1.9	SAFETY AND HEALTH—PACIFIC MISSILE RANGE FACILITY, KAUAI	3-12
3.1.10	WATER RESOURCES—PACIFIC MISSILE RANGE FACILITY, KAUAI	3-13
3.2	NIIHAU	3-13
3.2.1	BIOLOGICAL RESOURCES—NIIHAU	3-13
3.2.2	CULTURAL RESOURCES—NIIHAU	3-13
3.3	KAULA	3-14
3.3.1	AIRSPACE—KAULA	3-14
3.3.2	BIOLOGICAL RESOURCES—KAULA	3-14
3.3.3	CULTURAL RESOURCES—KAULA	3-15
3.3.4	SAFETY AND HEALTH—KAULA	3-15
3.3.5	WATER RESOURCES—KAULA	3-16
3.4	PEARL HARBOR, OAHU	3-16
3.4.1	AIRSPACE—PEARL HARBOR, OAHU	3-17
3.4.2	BIOLOGICAL RESOURCES—PEARL HARBOR, OAHU	3-17
3.4.3	SOCIOECONOMICS—PEARL HARBOR, OAHU	3-17
3.5	IROQUOIS LAND/UNDERWATER RANGE, OAHU	3-18
3.5.1	BIOLOGICAL RESOURCES—IROQUOIS LAND/UNDERWATER RANGE, OAHU	3-18
3.6	PU'ULOA UNDERWATER RANGE, OAHU	3-19
3.6.1	BIOLOGICAL RESOURCES—PU'ULOA UNDERWATER RANGE, OAHU	3-19
3.6.2	LAND USE—PU'ULOA UNDERWATER RANGE, OAHU	3-20
3.6.3	SAFETY AND HEALTH—PU'ULOA UNDERWATER RANGE, OAHU	3-20
3.7	BARBERS POINT UNDERWATER RANGE, OAHU	3-20
3.7.1	BIOLOGICAL RESOURCES—BARBERS POINT UNDERWATER RANGE, OAHU	3-20
3.7.2	LAND USE—BARBERS POINT UNDERWATER RANGE, OAHU	3-21
3.7.3	SAFETY AND HEALTH—BARBERS POINT UNDERWATER RANGE, OAHU	3-21
3.8	COAST GUARD AIR STATION BARBERS POINT/KALAELOA AIRPORT, OAHU	3-21

3.8.1	AIRSPACE—COAST GUARD AIR STATION BARBERS POINT/KALAELOA AIRPORT, OAHU	3-21
3.8.2	BIOLOGICAL RESOURCES—COAST GUARD AIR STATION BARBERS POINT/KALAELOA AIRPORT, OAHU	3-22
3.9	MARINE CORPS BASE HAWAII, OAHU	3-22
3.9.1	AIRSPACE—MARINE CORPS BASE HAWAII, OAHU	3-23
3.9.2	BIOLOGICAL RESOURCES—MARINE CORPS BASE HAWAII, OAHU	3-23
3.9.3	CULTURAL RESOURCES—MARINE CORPS BASE HAWAII, OAHU	3-24
3.9.4	NOISE—MARINE CORPS BASE HAWAII, OAHU	3-24
3.10	HICKAM AIR FORCE BASE, OAHU	3-25
3.10.1	AIRSPACE—HICKAM AIR FORCE BASE, OAHU	3-25
3.10.2	BIOLOGICAL RESOURCES—HICKAM AIR FORCE BASE, OAHU	3-25
3.10.3	CULTURAL RESOURCES—HICKAM AIR FORCE BASE, OAHU ..	3-25
3.11	MARINE CORPS TRAINING AREA BELLOWS/BELLOWS AIR FORCE STATION, OAHU	3-25
3.11.1	AIRSPACE—MARINE CORPS TRAINING AREA BELLOWS/BELLOWS AIR FORCE STATION, OAHU	3-26
3.11.2	BIOLOGICAL RESOURCES—MARINE CORPS TRAINING AREA BELLOWS/BELLOWS AIR FORCE STATION, OAHU	3-26
3.11.3	CULTURAL RESOURCES—MARINE CORPS TRAINING AREA BELLOWS/ BELLOWS AIR FORCE STATION, OAHU	3-27
3.11.4	LAND USE—MARINE CORPS TRAINING AREA BELLOWS/BELLOWS AIR FORCE STATION, OAHU	3-27
3.11.5	NOISE—MARINE CORPS TRAINING AREA BELLOWS/BELLOWS AIR FORCE STATION, OAHU	3-27
3.12	KAHUKU TRAINING AREA, OAHU	3-28
3.12.1	AIRSPACE—KAHUKU TRAINING AREA, OAHU	3-28
3.12.2	BIOLOGICAL RESOURCES—KAHUKU TRAINING AREA, OAHU	3-28
3.12.3	CULTURAL RESOURCES—KAHUKU TRAINING AREA, OAHU...	3-29
3.13	MAKUA MILITARY RESERVATION, OAHU	3-29
3.13.1	AIRSPACE—MAKUA MILITARY RESERVATION, OAHU	3-29
3.13.2	BIOLOGICAL RESOURCES—MAKUA MILITARY RESERVATION, OAHU	3-29
3.13.3	CULTURAL RESOURCES—MAKUA MILITARY RESERVATION, OAHU	3-31
3.13.4	NOISE—MAKUA MILITARY RESERVATION, OAHU	3-31
3.13.5	SAFETY AND HEALTH—MAKUA MILITARY RESERVATION, OAHU	3-32
3.14	DILLINGHAM MILITARY RESERVATION, OAHU	3-32
3.14.1	AIRSPACE—DILLINGHAM MILITARY RESERVATION, OAHU	3-32
3.14.2	BIOLOGICAL RESOURCES—DILLINGHAM MILITARY RESERVATION, OAHU	3-33
3.14.3	CULTURAL RESOURCES—DILLINGHAM MILITARY RESERVATION, OAHU	3-33

3.15	WHEELER ARMY AIRFIELD, OAHU	3-33
3.15.1	BIOLOGICAL RESOURCES—WHEELER ARMY AIRFIELD	3-34
3.16	K-PIER, KAWAIHAE, HAWAII	3-34
3.16.1	BIOLOGICAL RESOURCES—K-PIER KAWAIHAE, HAWAII	3-34
3.16.2	LAND USE—K-PIER KAWAIHAE, HAWAII	3-34
3.17	BRADSHAW ARMY AIRFIELD, HAWAII	3-35
3.17.1	AIRSPACE—BRADSHAW ARMY AIRFIELD, HAWAII	3-35
3.17.2	BIOLOGICAL RESOURCES—BRADSHAW ARMY AIRFIELD, HAWAII	3-35
3.17.3	CULTURAL RESOURCES—BRADSHAW ARMY AIRFIELD, HAWAII	3-35
3.18	POHAKULOA TRAINING AREA, HAWAII	3-36
3.18.1	AIRSPACE—POHAKULOA TRAINING AREA, HAWAII	3-36
3.18.2	BIOLOGICAL RESOURCES—POHAKULOA TRAINING AREA, HAWAII	3-36
3.18.3	CULTURAL RESOURCES—POHAKULOA TRAINING AREA, HAWAII	3-37
3.18.4	NOISE—POHAKULOA TRAINING AREA, HAWAII	3-37
3.18.5	SAFETY AND HEALTH—POHAKULOA TRAINING AREA, HAWAII	3-38
3.18.6	WATER RESOURCES—POHAKULOA TRAINING AREA, HAWAII	3-38
3.19	OCEAN AREA (OUTSIDE U.S. TERRITORY), HAWAIIAN ISLANDS	3-38
3.19.1	AIRSPACE—OCEAN AREA, HAWAIIAN ISLANDS	3-38
3.19.2	BIOLOGICAL RESOURCES—OCEAN AREA, HAWAIIAN ISLANDS	3-39
3.19.3	SAFETY AND HEALTH—OCEAN AREA, HAWAIIAN ISLANDS ..	3-39
3.19.4	WATER RESOURCES—OCEAN AREA, HAWAIIAN ISLANDS	3-40
3.20	KEEHI LAGOON, OAHU	3-40
3.20.1	BIOLOGICAL RESOURCES—KEEHI LAGOON, OAHU	3-40
3.20.2	SOCIOECONOMICS—KEEHI LAGOON, OAHU	3-40
4.0	ENVIRONMENTAL CONSEQUENCES	4-1
4.1	PROPOSED ACTION	4-1
4.1.1	PACIFIC MISSILE RANGE FACILITY (PORT ALLEN, MAKAHA RIDGE), KAUAI	4-2
4.1.1.1	Air Quality—Pacific Missile Range Facility, Kauai— SAMEX, AAMEX, SSMEX	4-2
4.1.1.2	Airspace—Pacific Missile Range Facility (Port Allen, Makaha Ridge), Kauai—C2, AIROPS, SAMEX, AAMEX, CASEX, SPECWAROPS, DEMO, AMPHIBEX	4-3
4.1.1.3	Biological Resources—Pacific Missile Range Facility (Port Allen, Makaha Ridge), Kauai—AIROPS, SAMEX, AAMEX, SSMEX, SMWEX, SPECWAROPS, DEMO, AMPHIBEX	4-3

4.1.1.4	Cultural Resources—Pacific Missile Range Facility, Kauai—SAMEX, AAMEX, SSMEX, SPECWAROPS, DEMO, AMPHIBEX,.....	4-5
4.1.1.5	Geology and Soils—Pacific Missile Range Facility, Kauai—SAMEX, AAMEX, SSMEX, SPECWAROPS, DEMO, AMPHIBEX.....	4-6
4.1.1.6	Hazardous Materials and Waste—Pacific Missile Range Facility, Kauai—AIROPS, SAMEX, AAMEX, SSMEX, AMPHIBEX	4-6
4.1.1.7	Land Use—Pacific Missile Range Facility, Kauai—AIROPS, SAMEX, AAMEX, SSMEX, SPECWAROPS, AMPHIBEX	4-6
4.1.1.8	Noise—Pacific Missile Range Facility, Kauai—AIROPS, SAMEX, AAMEX, SSMEX, SPECWAROPS, DEMO, AMPHIBEX	4-7
4.1.1.9	Safety and Health—Pacific Missile Range Facility, Kauai—AIROPS, SAMEX, AAMEX, SSMEX, SPECWAROPS, DEMO, AMPHIBEX	4-8
4.1.1.10	Water Resources—Pacific Missile Range Facility, Kauai—SAMEX, AAMEX, SSMEX	4-10
4.1.2	NIIHAU	4-11
4.1.2.1	Biological Resources—Niihau—SPECWAROPS	4-11
4.1.2.2	Cultural Resources—Niihau—SPECWAROPS.....	4-11
4.1.3	KAULA.....	4-11
4.1.3.1	Airspace—Kaula—STWEX, GUNNEX	4-11
4.1.3.2	Biological Resources—Kaula—STWEX, GUNNEX	4-11
4.1.3.3	Cultural Resources—Kaula—STWEX, GUNNEX	4-11
4.1.3.4	Safety and Health—Kaula—STWEX, GUNNEX	4-12
4.1.3.5	Water Resources—Kaula—STWEX, GUNNEX.....	4-12
4.1.4	PEARL HARBOR (FORD ISLAND, MDSU-1 FACILITY, SURROUNDING HARBOR), OAHU.....	4-12
4.1.4.1	Airspace—Pearl Harbor (Ford Island), Oahu—C2, AIROPS, SPECWAROPS.....	4-12
4.1.4.2	Biological Resources—Pearl Harbor (Ford Island), Oahu—IN-PORT/SUPPORTEX, SPECWAROPS, SALVAGE OPS	4-12
4.1.4.3	Socioeconomics—Pearl Harbor (Ford Island), Oahu—IN-PORT/SUPPORTEX	4-13
4.1.5	IROQUOIS LAND/UNDERWATER RANGE, OAHU	4-14
4.1.5.1	Biological Resources—Iroquois Land/Underwater Range, Oahu—SPECWAROPS, DEMO.....	4-14
4.1.6	PU’ULOA UNDERWATER RANGE, OAHU.....	4-14
4.1.6.1	Biological Resources—Pu’uloa Underwater Range, Oahu—SPECWAROPS, DEMO, SALVAGE OPS	4-14
4.1.6.2	Land Use—Pu’uloa Underwater Range, Oahu—DEMO	4-14
4.1.6.3	Safety and Health—Pu’uloa Underwater Range, Oahu—SPECWAROPS, DEMO, SALVAGE OPS	4-15

4.1.7	BARBERS POINT UNDERWATER RANGE, OAHU.....	4-15
4.1.7.1	Biological Resources—Barbers Point Underwater Range, Oahu—SPECWAROPS, DEMO.....	4-15
4.1.7.2	Land Use—Barbers Point Underwater Range, Oahu—SPECWAROPS, DEMO	4-15
4.1.7.3	Safety and Health—Barbers Point Underwater Range, Oahu—SPECWAROPS, DEMO.....	4-16
4.1.8	COAST GUARD AIR STATION BARBERS POINT/KALAELOA AIRPORT, OAHU	4-16
4.1.8.1	Airspace—Coast Guard Air Station Barbers Point/Kalaeloa Airport, Oahu—AIROPS, SPECWAROPS	4-16
4.1.8.2	Biological Resources—Coast Guard Air Station Barbers Point/Kalaeloa Airport, Oahu—SPECWAROPS	4-16
4.1.9	MARINE CORPS BASE HAWAII, OAHU	4-17
4.1.9.1	Airspace—Marine Corps Base Hawaii, Oahu—C2, AIROPS, HAO/NEO, HA/DR, SPECWAROPS, AMPHIBEX.....	4-17
4.1.9.2	Biological Resources—Marine Corps Base Hawaii, Oahu—HAO/NEO, HA/DR, SPECWAROPS, AMPHIBEX.....	4-17
4.1.9.3	Cultural Resources—Marine Corps Base Hawaii, Oahu—HAO/NEO, HA/DR, SPECWAROPS, AMPHIBEX.....	4-17
4.1.9.4	Noise—Marine Corps Base Hawaii, Oahu—AIROPS, HAO/NEO, HA/DR, SPECWAROPS, AMPHIBEX.....	4-17
4.1.10	HICKAM AIR FORCE BASE, OAHU.....	4-18
4.1.10.1	Airspace—Hickam Air Force Base, Oahu—AIROPS, SPECWAROPS	4-18
4.1.10.2	Biological Resources—Hickam Air Force Base, Oahu—SPECWAROPS, SALVAGE OPS	4-18
4.1.10.3	Cultural Resources—Hickam Air Force Base, Oahu—SPECWAROPS	4-18
4.1.11	BELLOWS AIR FORCE STATION, OAHU	4-18
4.1.11.1	Airspace—Bellows Air Force Station, Oahu—HAO/NEO HA/DR, SPECWAROPS, AMPHIBEX.....	4-18
4.1.11.2	Biological Resources—Bellows Air Force Station, Oahu—HAO/NEO, HA/DR, AMPHIBEX	4-18
4.1.11.3	Cultural Resources—Bellows Air Force Station, Oahu—HAO/NEO HA/DR, SPECWAROPS, AMPHIBEX.....	4-20
4.1.11.4	Land Use—Bellows Air Force Station, Oahu—HAO/NEO, HA/DR, SPECWAROPS, AMPHIBEX.....	4-20
4.1.11.5	Noise—Bellows Air Force Station, Oahu—HAO/NEO, HA/DR, SPECWAROPS, AMPHIBEX.....	4-20
4.1.12	KAHUKU TRAINING AREA, OAHU	4-21
4.1.12.1	Airspace—Kahuku Training Area, Oahu—HAO/NEO, HA/DR, SPECWAROPS	4-21

4.1.12.2	Biological Resources—Kahuku Training Area, Oahu—HAO/NEO, HA/DR, SPECWAROPS	4-21
4.1.12.3	Cultural Resources—Kahuku Training Area, Oahu—HAO/NEO, HA/DR, SPECWAROPS	4-21
4.1.13	MAKUA MILITARY RESERVATION, OAHU	4-21
4.1.13.1	Airspace—Makua Military Reservation, Oahu—LFX, SPECWAROPS	4-21
4.1.13.2	Biological Resources—Makua Military Reservation, Oahu—LFX, SPECWAROPS	4-23
4.1.13.3	Cultural Resources—Makua Military Reservation, Oahu—LFX, SPECWAROPS	4-23
4.1.13.4	Noise—Makua Military Reservation, Oahu—LFX, SPECWAROPS	4-23
4.1.13.5	Safety and Health—Makua Military Reservation, Oahu—LFX, SPECWAROPS	4-23
4.1.14	DILLINGHAM MILITARY RESERVATION, OAHU	4-24
4.1.14.1	Airspace—Dillingham Military Reservation, Oahu—SPECWAROPS	4-24
4.1.14.2	Biological Resources—Dillingham Military Reservation, Oahu—SPECWAROPS	4-24
4.1.14.3	Cultural Resources—Dillingham Military Reservation, Oahu—SPECWAROPS	4-24
4.1.15	WHEELER ARMY AIRFIELD, OAHU	4-24
4.1.15.1	Biological Resources—Wheeler Army Airfield, Oahu—C2, AIOPS, SPECWAROPS	4-24
4.1.16	K-PIER KAWAIHAE, HAWAII	4-24
4.1.16.1	Biological Resources—K-Pier Kawaihae, Hawaii—SPECWAROPS, AMPHIBEX	4-24
4.1.16.2	Land Use—K-Pier Kawaihae, Hawaii—AMPHIBEX	4-25
4.1.17	BRADSHAW ARMY AIRFIELD, HAWAII	4-25
4.1.17.1	Airspace—Bradshaw Army Airfield, Hawaii—C2, AIOPS, SPECWAROPS	4-25
4.1.17.2	Biological Resources—Bradshaw Army Airfield, Hawaii—AIOPS, SPECWAROPS	4-25
4.1.17.3	Cultural Resources—Bradshaw Army Airfield, Hawaii—SPECWAROPS	4-26
4.1.18	POHAKULOA TRAINING AREA, HAWAII	4-26
4.1.18.1	Airspace—Pohakuloa Training Area, Hawaii—C2, STWEX, CASEX, LFX, SPECWAROPS	4-26
4.1.18.2	Biological Resources—Pohakuloa Training Area, Hawaii—STWEX, CASEX, LFX, SPECWAROPS	4-26
4.1.18.3	Cultural Resources—Pohakuloa Training Area, Hawaii—STWEX, CASEX, LFX, SPECWAROPS	4-26
4.1.18.4	Noise—Pohakuloa Training Area, Hawaii—STWEX, CASEX, LFX, SPECWAROPS	4-27
4.1.18.5	Safety and Health—Pohakuloa Training Area, Hawaii—STWEX, CASEX, LFX, SPECWAROPS	4-27

4.1.18.6	Water Resources—Pohakuloa Training Area, Hawaii—STWEX, CASEX, LFX, SPECWAROPS	4-27
4.1.19	OCEAN AREA, HAWAIIAN ISLANDS	4-28
4.1.19.1	Airspace—Ocean Area, Hawaiian Islands—C2, SAMEX, AAMEX, ASMEX, SSMEX, ASWEX, MINEX, STWEX, GUNNEX, SINKEX, SPECWAROPS, SUBOPS.....	4-28
4.1.19.2	Biological Resources—Ocean Area, Hawaiian Islands—SAMEX, AAMEX, ASMEX, SSMEX, ASWEX, MINEX, STWEX, GUNNEX, SINKEX, DEMO, SUBOPS	4-28
4.1.19.3	Safety and Health—Ocean Area, Hawaiian Islands—SAMEX, AAMEX, ASMEX, SSMEX, ASWEX, STWEX, GUNNEX, SINKEX, SPECWAROPS, DEMO, SUBOPS.....	4-30
4.1.19.4	Water Resources—Ocean Area, Hawaiian Islands— SAMEX, AAMEX, ASMEX, SSMEX, ASWEX, STWEX, GUNNEX, SINKEX, DEMO, SUBOPS	4-31
4.1.20	KEEHI LAGOON, OAHU	4-32
4.1.20.1	Biological Resources—Keehi Lagoon, Oahu— SALVAGE OPS	4-32
4.1.20.2	Socioeconomics—Keehi Lagoon, Oahu—SALVAGE OPS	4-32
4.2	NO-ACTION ALTERNATIVE	4-32
4.3	CUMULATIVE IMPACTS	4-32
4.4	MITIGATION MEASURES	4-33
4.5	ADVERSE ENVIRONMENTAL EFFECTS THAT CANNOT BE AVOIDED	4-33
4.6	CONSISTENCY WITH FEDERAL, REGIONAL, STATE, LOCAL, OR NATIVE AMERICAN LAND-USE PLANS, POLICIES, AND CONTROLS	4-34
4.7	ENERGY REQUIREMENTS AND CONSERVATION POTENTIAL.....	4-34
4.8	IRREVERSIBLE OR IRRETRIEVABLE COMMITMENT OF RESOURCES.....	4-34
4.9	RELATIONSHIP BETWEEN SHORT-TERM USES OF THE HUMAN ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY	4-34
4.10	NATURAL OR DEPLETABLE RESOURCE REQUIREMENTS AND CONSERVATION POTENTIAL	4-35
4.11	FEDERAL ACTION TO ADDRESS ENVIRONMENTAL JUSTICE IN MINORITY POPULATIONS AND LOW-INCOME POPULATIONS.....	4-35
4.12	FEDERAL ACTION TO ADDRESS PROTECTION OF CHILDREN FROM ENVIRONMENTAL HEALTH RISKS AND SAFETY RISKS.....	4-35
5.0	CONSULTATION AND COORDINATION	5-1
6.0	REFERENCES	6-1
7.0	LIST OF PREPARERS AND CONTRIBUTORS	7-1

APPENDICES

A	RIMPAC 2000 OPERATIONAL ORDER ENVIRONMENTAL ANNEX
B	THREATENED AND ENDANGERED SPECIES LISTS
C	DISTRIBUTION LIST
D	GLOSSARY OF TERMS
E	MARINE BIOLOGICAL RESOURCES

FIGURES

2-1	Existing Exercise Locations for RIMPAC, Hawaiian Islands.....	2-5
2-2	Pearl Harbor Area/Hickam Air Force Base, Oahu, Hawaii	2-8
2-3	Location of Pacific Missile Range Facility and Related Sites, Kauai, Hawaii-	2-10
2-4	Marine Corps Base Hawaii/Bellows Air Force Station, Oahu, Hawaii	2-11
2-5	Wheeler Army Airfield Area, Oahu, Hawaii	2-12
2-6	Bradshaw Army Airfield and Pohakuloa Training Area, Hawaii, Hawaii	2-13
2-7	Barbers Point Underwater Range/Coast Guard Air Station Barbers Point/ Kalaeloa Airport, Oahu, Hawaii	2-15
2-8	Existing Special Use Airspace, Sea Surface, and Underwater Ranges, Hawaiian Islands.....	2-17
2-9	Dillingham/Makua Area, Oahu, Hawaii	2-27
2-10	Kahuku Military Training Area, Oahu, Hawaii	2-30
2-11	Iroquois Land and Underwater Range/Pu'uloa Underwater Range/Keehi Lagoon, Oahu, Hawaii	2-34
2-12	Kawaihae (K-Pier) and Access to Pohakuloa Training Area, Hawaii, Hawaii	2-39
2-13	Submarine Operations Area, Hawaiian Islands	2-41
2-14	Boarding Exercise, Hawaiian Islands	2-42
3-1	Pacific Missile Range Facility, Kauai, Hawaii	3-2
3-2	Airspace Use Surrounding Pacific Missile Range Facility, Kauai, Hawaii	3-5
3-3	High and Low Altitude Airways, Hawaiian Islands	3-6

TABLES

2-1	RIMPAC Representative Schedule	2-2
2-2	Typical Loadings for a RIMPAC Exercise	2-3
2-3	Proposed RIMPAC Exercises and Locations	2-6
2-4	Proposed Action Locations and Exercises.....	2-44
3-1	RIMPAC Resource Area Summary	3-3
4-1	Marine Mammal Area Clearance Based on Charge Weight at 9.1 Meters (30 Feet) Water Depth.....	4-4
4-2	Training Guidelines for Resource Protection—All Oahu Training Areas.....	4-22

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1.0

PURPOSE AND NEED

1.0 PURPOSE AND NEED

This document is a Commander Third Fleet (COMTHIRDFLT) U.S. Navy Programmatic Environmental Assessment (EA) that provides a comprehensive environmental analysis of defense exercises that are regularly conducted at various locations within the State of Hawaii and surrounding ocean areas. The exercises would be combined into a multinational sea control/power projection fleet training exercise known as Rim of the Pacific (RIMPAC). This Programmatic EA analyzes the environmental impacts of future RIMPAC exercise activities.

The following provide the framework for the U.S. Navy and U.S. Department of Defense (DoD) officials to consider environmental consequences when making decisions on their actions: section 102(2)(c) of the National Environmental Policy Act (NEPA) of 1969; the Council on Environmental Quality *Regulations of Implementing the Procedural Provisions of the National Environmental Policy Act* (40 Code of Federal Regulations [CFR] 1500-1508); DoD Instruction 4715.9, *Environmental Effects in the United States of Department of Defense Actions*; Naval Operations Instruction (OPNAVINST) 5090.1B, *Environmental and Natural Resources Program Manual*; Army Regulation 200-2, *Environmental Effects of Army Actions*; U.S. Air Force Instruction 32-7061, *Environmental Impact Analysis*; and Marine Corps Order P 5090.2, *Environmental Compliance and Protection Manual*. In addition, Executive Order (EO) 12114, *Environmental Effects Abroad of Major Federal Actions*, addresses consideration of environmental effects in decisions for actions outside the United States or its territories. The proposed federal activities primarily take place at existing training areas and sites at locations on the Hawaiian islands of Oahu, Kauai, Hawaii, Niihau, Kaula, and Molokai, as well as nearshore and open-ocean areas.

1.1 BACKGROUND

RIMPAC is a sea control/power projection fleet exercise that has been performed biennially since 1968. The objective of the historically month-long exercise is to enhance the interoperability and proficiency of several nations' maritime and air forces to operate in coalition arrangements centered on realistic littoral (coastal) operations. RIMPAC would continue to involve forces from various Rim-of-the-Pacific nations. In the past, these nations have included Australia, Canada, Chile, Japan, the Republic of Korea, and the United States. The United Kingdom, France, and Peru have been accepted to participate in RIMPAC 02, and others may be added in the future. Planning for a RIMPAC exercise begins 18 months before operations. RIMPAC would be typically conducted sometime between May and September.

Two prior RIMPAC EAs were produced for RIMPAC 98 and RIMPAC 2000 (U.S. Department of the Navy, 1998; 2000). After these two RIMPAC EAs were produced with findings of no significant environmental impact, it was determined to be in the best interest of the U.S. Navy and the public to develop a programmatic documentation. Through this

approach, the exercise would have more flexibility in its actions and paperwork would be reduced.

1.2 PURPOSE OF AND NEED FOR THE PROPOSED ACTION

The purpose of the Proposed Action is to combine a selected set of exercises into a multinational sea control/power projection fleet training exercise and implement it in a multi-threat environment. RIMPAC exercises demonstrate the ability of a multinational force to communicate and operate in simulated hostile scenarios. The Proposed Action would allow the proponent to consider the environment when implementing the exercises that would make up future RIMPAC exercises. These future exercises would be coordinated and conducted in open-ocean, nearshore, and onshore environments where they are routinely conducted as individual exercises.

To fully ensure the operational effectiveness of multinational forces, the capability is needed to continue to provide the required training environment. The proposed uses of selected federal and private lands and nearshore and open-ocean areas would provide the capability to conduct this necessary training. RIMPAC is needed to enhance communication and cooperation between nations, to ensure the United States can accomplish shared operational objectives with other nations, to provide operational forces with battle-realistic training including live-fire, and to meet proficiency requirements designed to keep operational forces ready for use as directed by the operational force commander. It is the responsibility of the decisionmaker to determine if the analysis presented in this Programmatic EA would result in a Finding of No Significant Impact in accordance with NEPA, or if preparation of an Environmental Impact Statement (EIS) is required.

1.3 DECISIONS TO BE MADE

NEPA-related decision to be made by the Federal Government:

- Whether to implement a specific combination of existing training exercises within the United States and U.S. territorial waters as part of a broad, multinational Command, Control, and Communications (C³) operational exercise known as RIMPAC.

An EO 12114-related decision to be made by the Federal Government:

- Whether to implement a specific combination of existing training exercises outside the United States and U.S. territorial waters as part of a broad, multinational C³ operational exercise known as RIMPAC. This would include the consideration of activities to be performed in the open-ocean environment outside the territorial limits of the United States.

The decisionmaker for the Federal Government is the Commander in Chief, U.S. Pacific Fleet (CINCPACFLT). The proponent is COMTHIRDFLT in consultation with Commander, Navy Region Hawaii (COMNAVREG HI) and CINCPACFLT.

1.4 SCOPE OF THIS PROGRAMMATIC ENVIRONMENTAL ASSESSMENT

This Programmatic EA identifies the Proposed Action as the set of exercises and locations that could be used for future RIMPAC activities (possibly five or more exercises), and describes the existing environment at the locations where the exercises could occur. The Programmatic EA evaluates the potential environmental effects of RIMPAC exercises at each location. Impacts could result from activities at onshore, nearshore, and open-ocean areas. Activities associated with the Proposed Action include in-port operations, aircraft operations, ship maneuvers, amphibious landings, troop movements, missile exercises, live fire exercises, submarine and antisubmarine exercises, mining and demolition activities, humanitarian assistance exercises, and special warfare operations.

This Programmatic EA addresses the reasonably foreseeable activities in the particular geographical areas affected by the Proposed Action and focuses on the activities with the greatest potential for impacts to the environment. Activities would use existing facilities and/or be conducted in existing training areas designated for the particular type of training and testing involved, or in areas where appropriate arrangements have been made for the use of the real estate.

Consistent with Council on Environmental Quality regulations, the scope of the analysis presented in this Programmatic EA was defined by the range of potential environmental impacts that could result from implementation of the Proposed Action and No-action Alternative. For the Programmatic EA analysis, the environment was initially considered in terms of 13 resource areas: air quality, airspace, biological resources, cultural resources, geology and soils, hazardous materials and waste, land use, noise, safety and health, socioeconomics, transportation, utilities, and water resources. Only those resources with a potential for impacts were included in the Programmatic EA analysis to provide the decisionmaker with sufficient evidence and analysis for evaluation of the potential effects of the action. Initial screening determined that because training exercises would take place at existing facilities and ranges routinely used for these types of activities, transportation and utilities would not be impacted and are therefore not included in this Programmatic EA. Ocean areas outside territorial waters were addressed in conformance with EO 12114, *Environmental Effects Abroad of Major Federal Actions*.

1.5 SCOPE OF FUTURE ENVIRONMENTAL REVIEWS

Prior to each future RIMPAC, beginning with RIMPAC 02, a review of the proposed activities will be compared to the analysis in this Programmatic EA to ensure all proposed activities have been addressed. If new installations or facilities are proposed, significantly different training levels (personnel and equipment) and types of equipment are deployed, or

the installation or range environmental sensitivities change, additional reviews or new analyses would be performed. Federal and state agencies would be briefed on the findings of each review and any new analyses. Based upon satisfactory analyses, coordination, and review, the decisionmaker would sign and publish a Finding of No Significant Impact for the RIMPAC exercise. This overall process would continue as long as the majority of the proposed activities remain covered by this Programmatic EA.

2.0

DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

2.0 DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

This chapter provides a programmatic overview of RIMPAC, including a description of the RIMPAC exercise (section 2.1); a description of the typical training exercises that could be combined to form RIMPAC (section 2.2), which is the Proposed Action; the No-action Alternative (section 2.3); and alternatives considered, but not carried forward (section 2.4).

2.1 DESCRIPTION OF THE RIMPAC EXERCISE

RIMPAC is a sea control/power projection fleet exercise that has been performed biennially in Hawaii since 1968. The objective of the exercise is to enhance the interoperability and proficiency of maritime and air forces operating in coalition arrangements centered on realistic, multi-threat littoral operations. RIMPAC traditionally consists of an 18-month planning phase and a 1-month operations phase. The operations phase includes in-port preparation and pre-exercise briefings, workup exercises, scenario-driven scripted exercises, and post-exercise activities. An Operations Order (OPORDER) is written prior to the exercise to describe specific activities and timing.

During initial planning meetings, the U.S. Navy Third Fleet solicits input from invited participants to understand the various testing and training needs. Range representatives consider these needs and assess the ability of ongoing testing and training exercises to accomplish them. Third Fleet operations personnel and range representatives work together to develop a general scenario to try to accommodate the testing and training needs. If existing exercises are not capable of providing the necessary testing and training, consideration is given to alternative or new testing or training techniques. Third Fleet and identified participants meet as a planning group to further develop and refine the general scenario based on budget and time constraints as well as safety and environmental considerations. Requirements and the scenario are modified throughout the planning process as participants determine whether they will be able to provide the personnel and assets necessary to conduct the exercises envisioned early in the planning process. Accordingly, exercise planners remain flexible throughout the planning process to accommodate participants' changing needs and intentions based on real world events and budgets.

There are generally three planning conferences during the year leading up to RIMPAC. The result of planning is a final scenario where, typically, one country, "Green," is attacked by another country, "Orange." Green has requested and received support from the Pacific Rim nations. The allies then use military force to eliminate military hostilities and restore peace to the region. The military activities occurring during the exercise vary from year to year and are based on the participants' training needs and desires. They may also be based in part on anticipated operations that may be required under real world conditions.

RIMPAC consists of various phases of activity during the exercise period. Modification and rearrangement of the phases may occur depending on the exercise objectives. Table 2-1 shows a representative example of a RIMPAC Exercise. Allied forces opposing Orange are usually split into multinational and bilateral forces, depending on which Pacific Rim allies participate. The Multinational Force would be composed of units from various Rim-of-the-Pacific nations. In the past, these nations have included Australia, Canada, Chile, the Republic of Korea, and the United States. The Bilateral Force consists of units from Japan and the United States. As previously mentioned in section 1.1, the United Kingdom, France, and Peru have been accepted to participate in RIMPAC 02. The Multinational Force would have up to 9 days of briefings and preparations in Pearl Harbor. They would then move to various onshore, nearshore, and open-ocean areas for up to 21 days of workup training exercises including amphibious insertions, and covert reconnaissance, which includes up to 6 days of advanced weapon firings at the Pacific Missile Range Facility (PACMISRFANFAC, herein PMRF) and the PMRF Warning Areas and underwater ranges.

Table 2-1: RIMPAC Representative Schedule

Activity Average Exercise Days (Expanded Exercise Days)	Total Number of Average Exercise Days	Total Number of Expanded Exercise Days
Multinational Force arrives at Pearl Harbor Day 1 (Days 1-2)	1	2
Multinational Force In Port Briefings Days 1-6 (Days 1-9)	6	9
Bilateral Force Arrives at Pearl Harbor Day 1 (Days 1-2)	1	2
Bilateral Force in-port briefings Days 1-3 and 11-14 (Days 1-5 and 16-21)	7	11
Multinational Force Workup Exercises Days 7-20 (Days 15-36)	14	21
Bilateral Force workup exercises Days 3-10 and 15-20 (Days 5-15 and 22-36)	14	28
Tactical Scenario Exercises Days 20-29 (Days 36-49)	10	14
Amphibious Landing Exercises Days 23 and 29 (Days 34-35 and 45-49)	2	4
Amphibious back-load Days 24 and 30 (Days 35-36 and 49-50)	2	4
Bilateral Force returns to Pearl Harbor Days 29-30 (Days 49-52)	2	4
Multinational Force returns to Pearl Harbor Days 29-30 (Days 49-52)	2	4
Post Exercise Activities Days 30-32 (Days 52-56)	3	5
Dispersal Day 33 (Days 56-57)	1	2

The Bilateral Force would initially have up to 5 days of briefings at Pearl Harbor. Up to 11 days of workup exercises would then be conducted by the Bilateral Force at onshore, nearshore, and open-ocean areas. The Bilateral Force would then return to Pearl Harbor for up to an additional 6 days of briefings, and then conduct up to an additional 15 days of workup exercises. The workup exercises include up to 6 days of advanced weapon firings at PMRF and the PMRF Warning Areas and underwater ranges for an average total of 14 days, or a maximum of 26 days.

The next phase of RIMPAC would consist of up to 14 days of complex scenario-driven tactical exercises intended to represent real-life conflict situations. An amphibious landing assault of PMRF by allied forces would be the culmination of the scripted phase of exercises.

Post-exercise briefings for all forces would be conducted at Pearl Harbor following completion of all scheduled exercises. A reception and numerous athletic events for participating forces would also be held at that time. In 1998, 56 ships, 8 submarines, 220 aircraft, and 27,100 personnel participated in RIMPAC exercises. In 2000, 46 ships, 7 submarines, 200 aircraft, and 22,000 personnel participated in RIMPAC exercises.

In 2002, an estimated 33 ships, 5 submarines, 52 aircraft, and 10,600 personnel will participate in RIMPAC exercises. For purposes of analyzing future RIMPAC exercises, ship, aircraft, and personnel loadings will be used that represent the anticipated Maximum participation (table 2-2). The Maximum RIMPAC exercise would include two or more Carrier Battle Groups, a Marine Expeditionary Brigade, a Marine Expeditionary Unit, and an Opposing Force.

Table 2-2: Typical Loadings for a RIMPAC Exercise

Forces	Ships	Submarines	Aircraft	Staff
Bilateral Force	11	1	65	6,500
Multinational Force	20	2	85	12,000
Commander Combined Task Force	6	0	23	1,400
Opposing Force	9	4	27	2,100
Typical	Total 46	7	200	22,000
Minimum	20	1	24	8,000
Maximum	60	10	260	30,000

Under the Minimum participation scenario, it is assumed that no carrier battle group would be able to attend and that there would be less than a full Amphibious Task Force (ATF). Although relatively small compared to the typical exercise scenario, the Minimum loading would still be sufficient to conduct a RIMPAC exercise.

2.2 DESCRIPTION OF TESTING AND TRAINING EXERCISES PROPOSED FOR RIMPAC

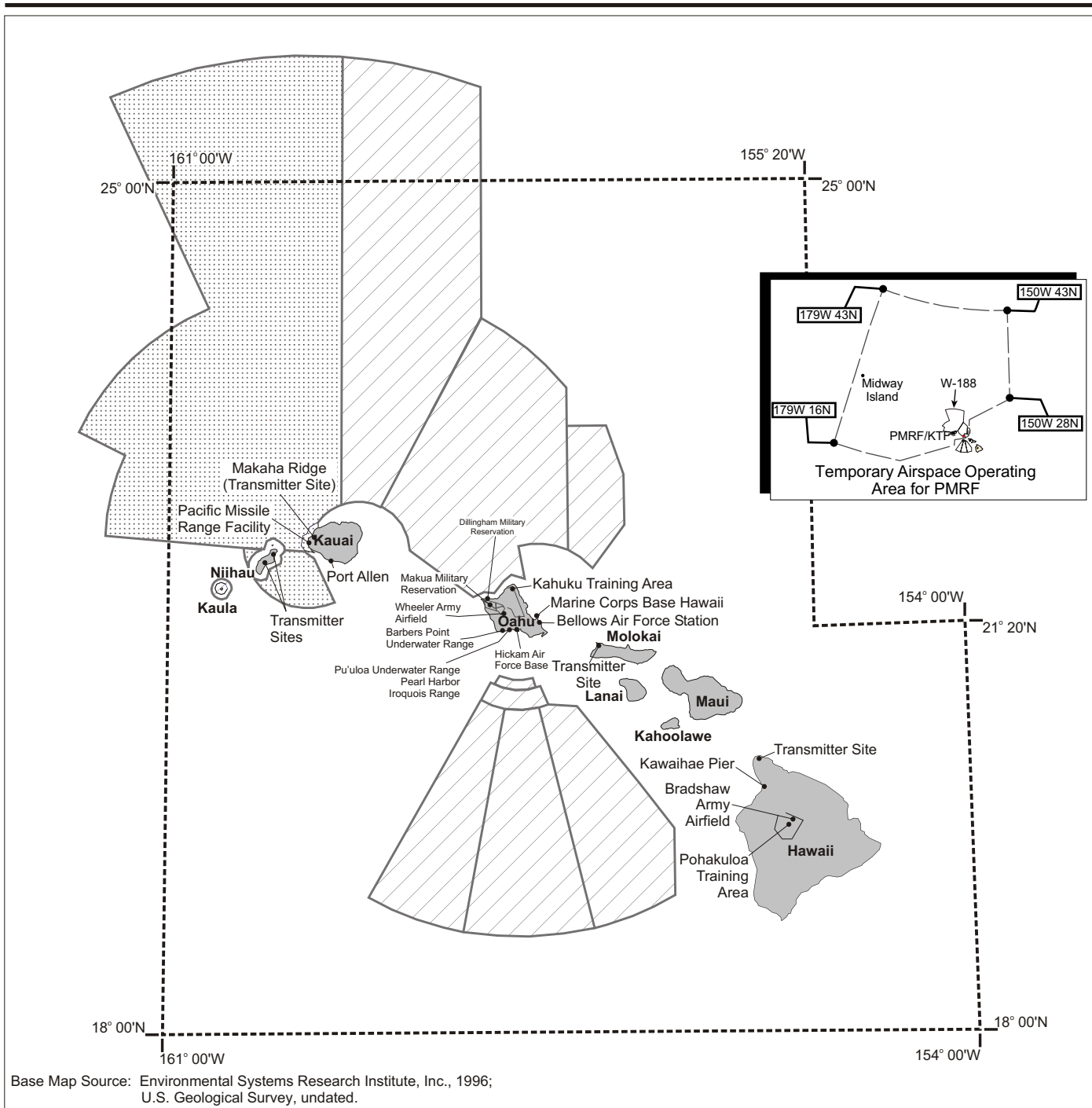
The exercises that are conducted during RIMPAC routinely occur in open-ocean, nearshore, and onshore environments that are already used for training. Figure 2-1 shows existing exercise locations proposed for RIMPAC. Table 2-3 is a list of proposed RIMPAC exercises and locations.

A description of each exercise is provided in the following sections. U.S. and foreign warships take reasonable precautions during the planning and execution of the operation of training exercises to minimize injury to human life and damage to the environment or property. Specific safety plans are developed to ensure that each hazardous operation is in compliance with applicable DoD policy and regulations and to ensure that the general public and range personnel and assets are provided an acceptable level of safety. Therefore, safety and health issues are only addressed herein when RIMPAC activities pose a potential risk to the public. The standard operating procedures also provide for protection of biological and cultural resources by avoiding areas where these resources are known to exist. RIMPAC exercises would comply with all applicable environmental laws and regulations, including EO 13112 as amended, *Invasive Species*, EO Order 13089, *Coral Reef Protection*, and EO 13178, *Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve*. EO 13196, *Final Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve*, amended EO 13178 by finalizing several provisions of EO 13196.








2.2.1 IN-PORT ACTIVITIES (IN-PORT), SUPPORT ACTIVITIES (SUPPORTEX)

Purpose—The purpose of the in-port activities is to give briefing and debriefing for exercises, and in-port training. Simultaneously, major support activities are performed. Ships in-port must be berthed, take on supplies, receive repairs, plan for refueling (normal refueling operations would take place at sea), load ammunition, and conduct other maintenance activities, as required. Temporary housing is provided both on and off installation. Off-installation housing can range from 700 to 1,500 units. Approximately 1,000 units will be needed for RIMPAC 02.

Description—IN-PORT includes the typical operations that are carried out when foreign and U.S. warships and submarines are berthed at Pearl Harbor. This includes in-port briefings and debriefings and in-port training activities, including oil spill response training. In addition, some exercises conclude with receptions, athletic events, and other social activities. Simultaneously, SUPPORTEX would be conducted. Once berthed, ships would re-supply, plan for refueling, load ammunition, and conduct other maintenance activities, including the off loading of solid wastes and wastewater (black and gray water). This is all accomplished while speaking a range of different languages between various ships, military offices, and contractors. In addition, non-typical orders are processed to acquire country unique items that are not normally handled by the U.S. Fleet. The Federal Industrial Supply Center located at Pearl Harbor is the organization responsible to complete these orders.



EXPLANATION

- | | |
|---|--|
|  Land Area |  PMRF Warning Areas |
|  Water Area |  Oahu Warning Areas |
|  Warning Area | |
|  Restricted Airspace | |
|  Submarine Operations Area | |



Scale 1:5,400,000

0 69 137 Kilometers

0 37 74 Nautical Miles

Existing Exercise Locations for RIMPAC

Hawaiian Islands

Figure 2-1

Table 2-3: Proposed RIMPAC Exercises and Locations

Exercise/Activity	Locations
In-port activities (IN-PORT) *	Pearl Harbor, Oahu *
Command and Control (C2) *	PMRF, Kauai*; Pearl Harbor, Oahu*; Marine Corps Base Hawaii, Oahu*; Hickam Air Force Base, Oahu; Wheeler Army Airfield, Oahu; Bradshaw Army Airfield, Hawaii; Pohakuloa Training Area, Hawaii*; U.S. command ships
Aircraft Operations Support (AIROPS) *	PMRF, Kauai*; Pearl Harbor, Oahu*; Coast Guard Air Station Barbers Point/Kalaeloa Airport, Oahu; Marine Corps Base Hawaii, Oahu*; Hickam Air Force Base, Oahu*; Wheeler Army Airfield, Oahu; Bradshaw Army Airfield, Hawaii*
Surface-to-Air Missile Exercise (SAMEX) *	PMRF, Kauai*; PMRF Warning Areas*
Air-to-Air Missile Exercise (AAMEX) *	PMRF, Kauai*; PMRF Warning Areas*
Air-to-Surface Missile Exercise (ASMEX) *	PMRF Warning Areas*
Surface-to-Surface Missile Exercise (SSMEX) *	PMRF, Kauai*; PMRF Warning Areas*
Anti-Submarine Warfare Exercise (ASWEX) *	PMRF and Oahu Warning Areas*; Open Ocean Areas*
Aerial Mining Exercise (MINEX) *	PMRF Warning Area*
Ship Mine Warfare Exercise (SMWEX) *	PMRF Mine Warfare Training Area*
Strike Warfare Exercise (STWEX), and Close Air Support Exercise (CASEX) *	PMRF, Kauai*; Kaula; PMRF Warning Areas; Pohakuloa Training Area, Hawaii*
Gunnery Exercise (GUNNEX) *	Kaula; PMRF Warning Areas*; Oahu Warning Areas*
Sinking Exercise (SINKEX) *	PMRF Warning Area W-188*
Live Fire Exercise (LFX)	Makua Military Reservation, Oahu; Pohakuloa Training Area, Hawaii
Humanitarian Assistance Operation/Non-combatant Evacuation Operation (HAO/NEO)	Marine Corps Base Hawaii, Oahu; Marine Corps Training Area Bellows/Bellows Air Force Station, Oahu; Kahuku Training Area, Oahu
Humanitarian Assistance/Disaster Relief (HA/DR)	Marine Corps Base Hawaii, Oahu; Marine Corps Training Area Bellows/Bellows Air Force Station, Oahu; Kahuku Training Area, Oahu
Special Warfare Operations (SPECWAROPS) *	PMRF, Kauai (R&S inserts, beach survey)*; PMRF Makaha Ridge (Down Pilot, R&S Inserts)*; PMRF, Port Allen*, Kauai (R&S, boat raid [Staging/Debarcation])*; Niihau (Down Pilot, R&S inserts); Pearl Harbor/Ford Island (R&S inserts, harbor survey, ship attack; parachute operations, blank firing); Coast Guard Air Station Barbers Point/Kalaeloa Airport, Marine Corps Base Hawaii, Oahu, Hickam Air Force Base, Marine Corps Training Area Bellows/Bellows Air Station, Oahu, Kahuku Training Area, Oahu (R&S inserts); K-Pier, Hawaii, Bradshaw Army Airfield, Hawaii (R&S inserts, helicopter raid); Pohakuloa Training Area, Hawaii (R&S insert, in and outside of impact area); Makua Military Reservation, Oahu (R&S inserts, helicopter raid); Dillingham Military Reservation, Oahu (R&S inserts, snipers); Wheeler Army Airfield (R&S inserts); Underwater Ranges; Oahu Warning Areas, PMRF Warning Areas; Open Ocean Areas

* Exercises and locations proposed for RIMPAC 02

PMRF = Pacific Missile Range Facility

R&S = Reconnaissance and Surveillance

Table 2-3: Proposed RIMPAC Exercises and Locations (Continued)

Exercise/Activity	Locations
Underwater Demolition Exercises (DEMO) *	PMRF and Oahu Warning Areas; Iroquois Land/Underwater Range, Pearl Harbor; Pu'uloa Underwater Range (outside of Pearl Harbor), Oahu*; PMRF, Kauai; Open Ocean Areas; Barbers Point Underwater Range (off-shore of Coast Guard Air Station Barbers Point)
Salvage Operations (SALVAGE OPS) *	Pearl Harbor, Oahu (MDSU-1 staging) *; Pu'uloa Underwater Range, Oahu*; Keehi Lagoon, Oahu*
Amphibious Exercise (AMPHIBEX) *	PMRF, Kauai*; Marine Corps Training Area Bellows/Bellows Air Force Station, Oahu; Marine Corps Base Hawaii, Oahu*; K-Pier Kawaihae, Hawaii*
Submarine Operations (SUBOPS) *	PMRF and Oahu Warning Areas; Open Ocean Areas*
Other Activities *	Transmitter Sites—Niihau, Molokai, Kauai, Oahu, Hawaii Boarding Exercises—Open Ocean Areas*

* Exercises and locations proposed for RIMPAC 02

MDSU-1 = U.S. Navy's Mobile Diving and Salvage Unit One

PMRF = Pacific Missile Range Facility

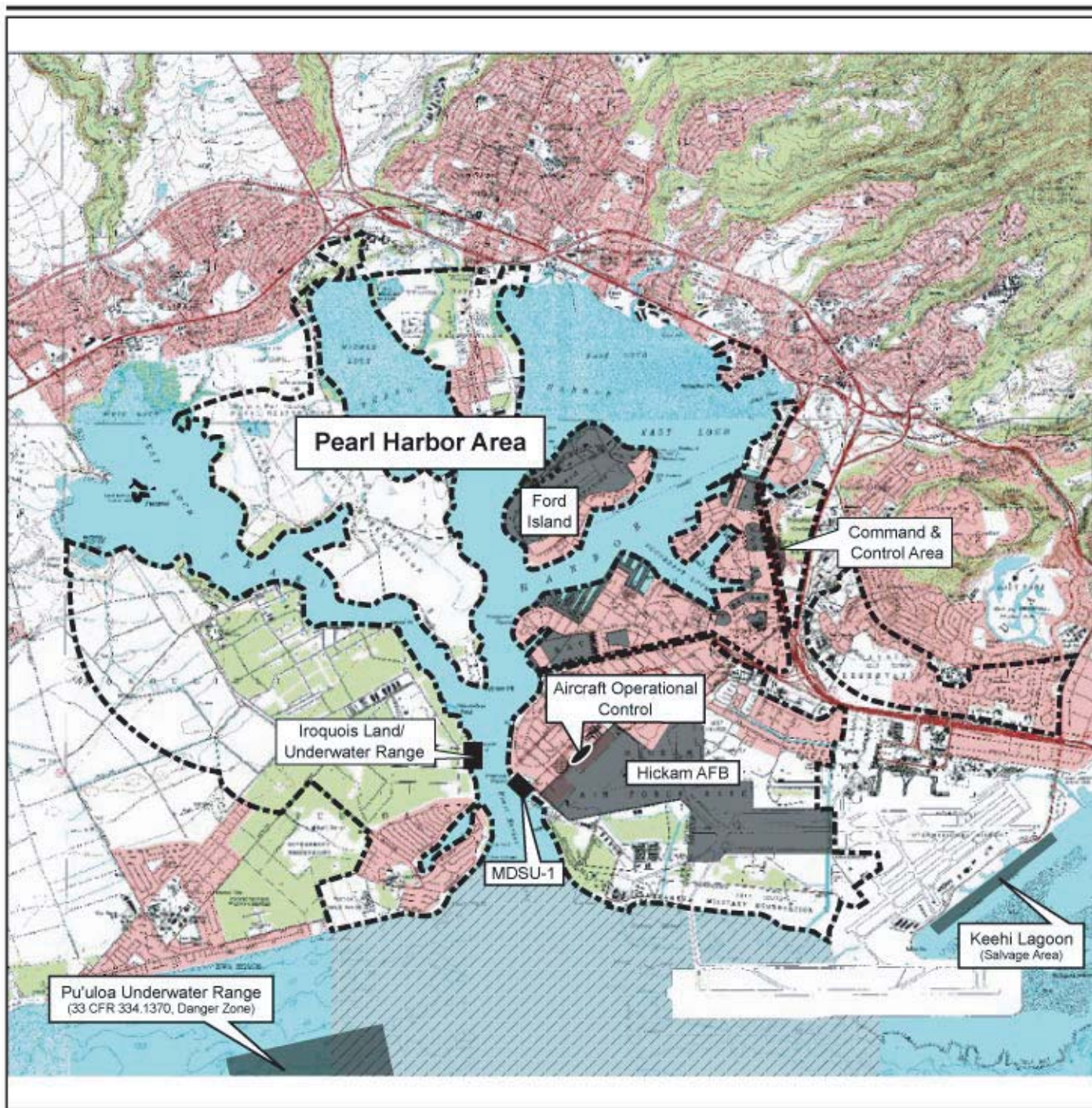
Pearl Harbor is a restricted area. No vessels are allowed into Pearl Harbor without permission of Commander Naval Region Hawaii. The restricted area extends outward from the mouth of the harbor and is defined by a rectangular-shaped boundary known as the Pearl Harbor Naval Defensive Sea Area.

Assets—Includes both ship and shore assets. Shore assets include berthing space and utility hookups, harbor coordination and control activities, space management activities for equipment and personnel, and other ongoing shore facilities management activities. Refueling and re-supply will also be carried out. Pearl Harbor currently is home to 31 surface ships and submarines. The harbor has contained more than 60 warships during prior RIMPACs and on other occasions.

Location—Pearl Harbor, Oahu (figure 2-2).

Duration—IN-PORT for Fleet training exercises generally lasts 3 to 25 days.

Standard Procedures—U.S. Navy instructions based on laws and regulations concerning in-port operations are followed. Foreign warships are requested to comply. Fleet training exercises also have specific requirements and regulations called out in their OPORDER. The environmental annex from the RIMPAC 2000 OPORDER is included as an example in appendix A. Prior to arrival at Pearl Harbor, briefings will be provided to all foreign and U.S. participants on expectations and requirements. Topics briefed include berthing locations, resupply procedures, black/gray water discharges, and hazardous and solid waste disposal, especially for foreign wastes.



EXPLANATION

- Installation Boundary
- RIMPAC Exercise Area
- ▨ Pearl Harbor Naval Defensive Sea Area

AFB = Air Force Base

MDSU-1 = Mobile Diving and Salvage Unit One



Scale
0 0.95 1.9 Kilometers
0 0.6 1.2 Miles

05-24-02 Pearl Harbor Base

Pearl Harbor Area/ Hickam Air Force Base

Oahu, Hawaii

Figure 2-2

RIMPAC Programmatic EA

2.2.2 COMMAND AND CONTROL (C2)

Purpose—The purpose of the C2 activities is to provide command and control support for the overall exercise. C2 activities are performed from both land and sea during the full exercise evaluation. Each activity is monitored and coordinated for safety and on-time performance, as well as to ensure training objectives are accomplished, and to identify lessons learned for future activities and exercises. Overall command functions are normally performed from a command ship. RIMPAC 02 overall command will be from land facilities at Pearl Harbor.

Description—C2 is achieved through a network of communication devices strategically located at selected DoD installations around the islands to ensure positive communication with the exercise participants. The command center would be located at Pearl Harbor for RIMPAC 02. C2 for the overall operation is normally performed from a U.S. Navy command ship. The services of a specific C2 ship are not planned for RIMPAC 02 although some functions may be performed on other warships. All functions and support crew will be on land. Other C2 functions on land and at sea will continue as before.

Assets—Includes both ship and shore assets. Shore assets include coordination and control activities at range control offices and through air traffic centers of the participating installations, and other ongoing C2 activities.

Location—Pearl Harbor (figure 2-2); PMRF (figure 2-3); Hickam Air Force Base (figure 2-2); Marine Corps Base Hawaii, (figure 2-4); Wheeler Army Airfield (figure 2-5); Bradshaw Army Airfield (figure 2-6); Pohakuloa Training Area, Hawaii (figure 2-6) and U.S. command ships.

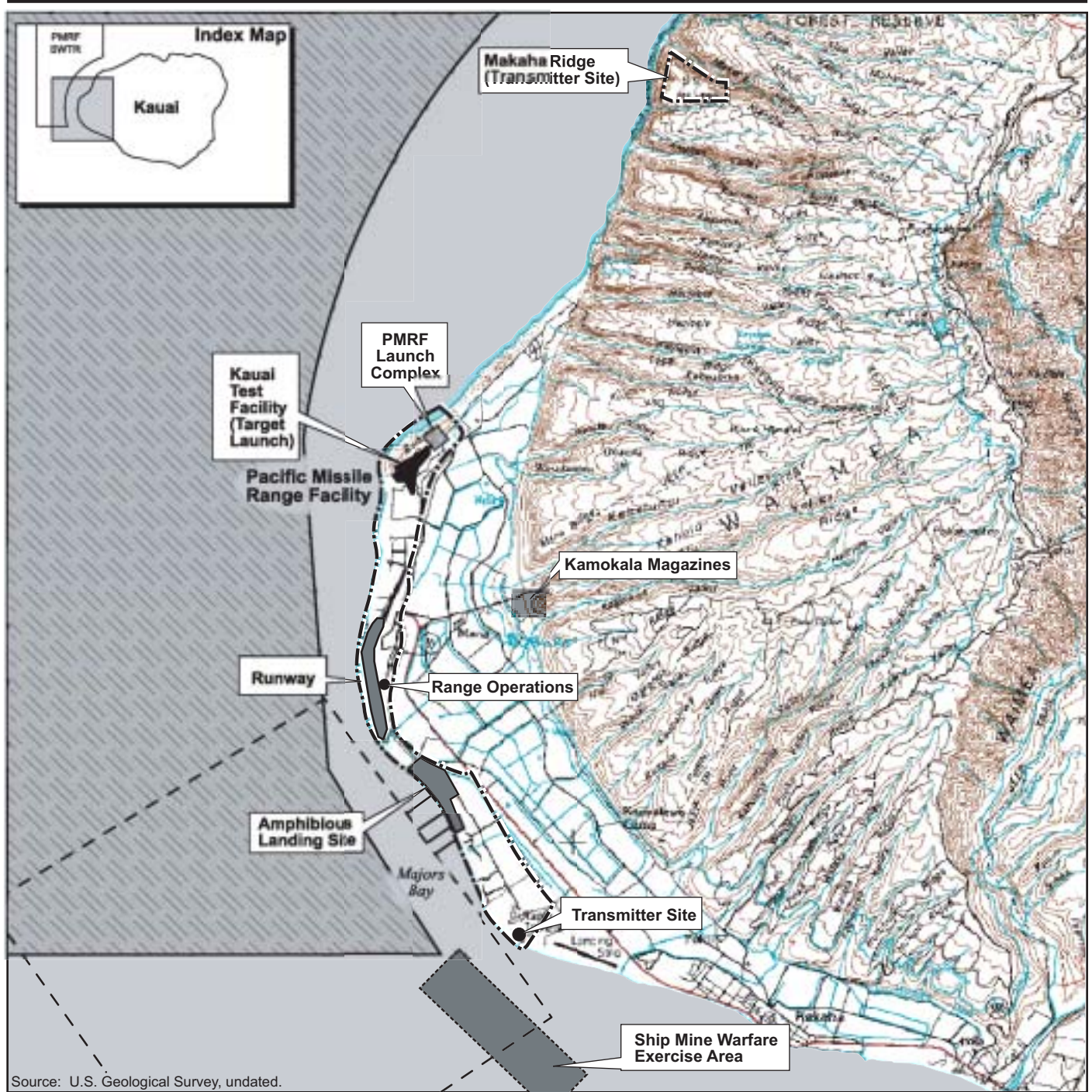
Duration—C2 activities for RIMPAC exercises generally last the length of RIMPAC (from 20 to 57 days).

Standard Procedures—U.S. Navy instructions and standard operating procedures for U.S. Army, U.S. Air Force, and the Federal Aviation Administration (FAA), based on laws and regulations concerning operations are followed. Fleet training exercises also have specific requirements and regulations called out in the OPORDER.

2.2.3 AIRCRAFT OPERATIONS SUPPORT (AIOPS)

Purpose—To provide operational support for maritime, air force, and other aircraft, including an airship. Air operations support is required to ensure the safe operation of all air activities.

Description—Aircraft support includes space for the various types of aircraft, equipment for refueling and maintenance, and housing for aircraft crews and support personnel.



EXPLANATION

- Installation Boundary
- RIMPAC Exercise Area
- PMRF Shallow Water Training Range
- Potential AMPHIBEX/DEMO Area
- Boat Raid Location



Scale
0 1.5 2.9 Kilometers
0 .9 1.8 Miles

05-24-02 Loc PMRF

Location of Pacific Missile Range Facility and Related Sites

Kauai, Hawaii

Figure 2-3

RIMPAC Programmatic EA



EXPLANATION

--- Base Boundary

■ RIMPAC Exercise Area

LCAC = Landing Craft, Air-cushion

LCU = Landing Craft, Utility

AAV = Assault Amphibian Vehicle

CRRC = Combat Rubber Reconnaissance Craft

RHIB = Ridged Hull, Inflatable Boat



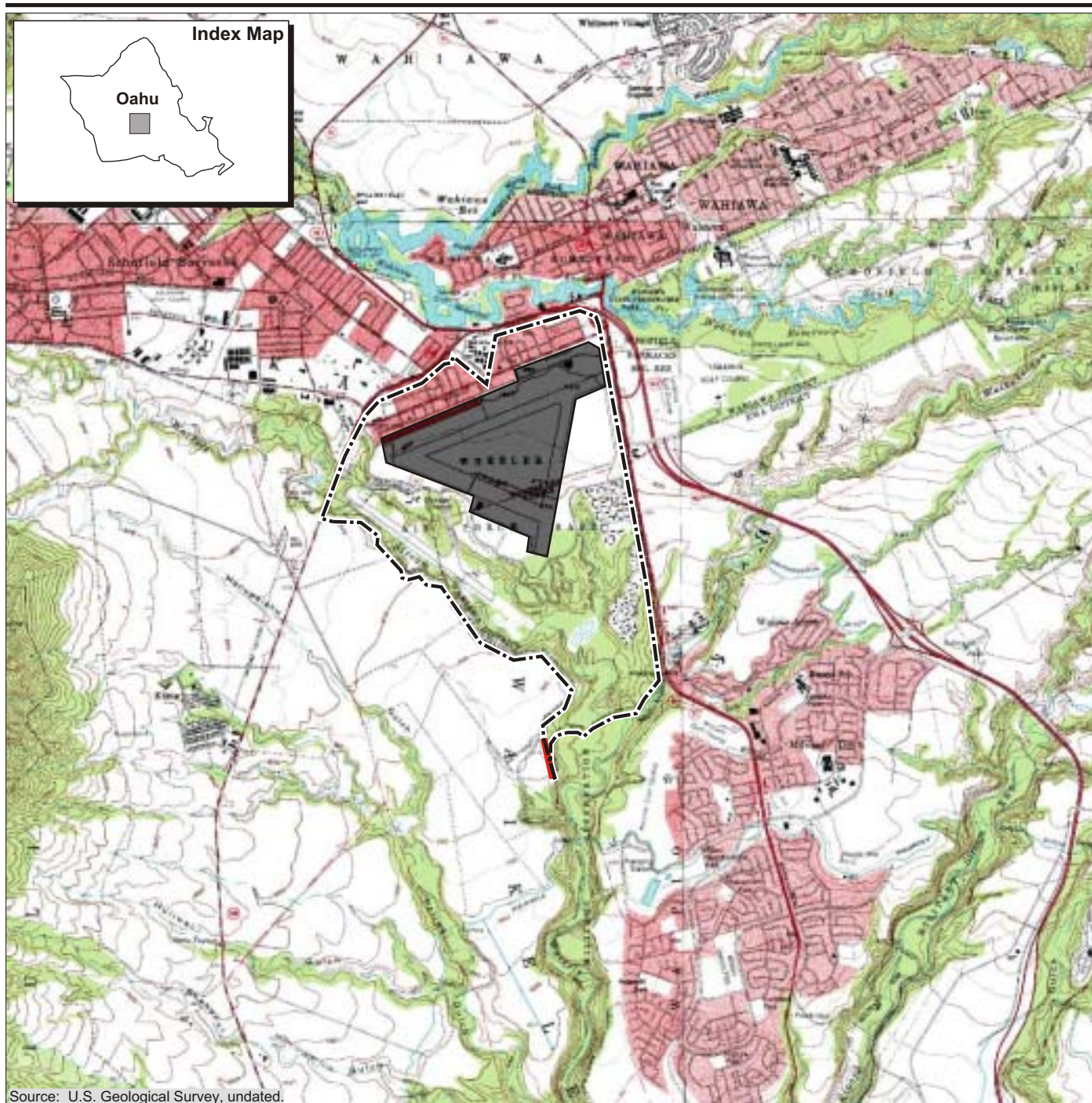
Scale 1:100,000

0 1.3 2.6 Kilometers
0 .8 1.6 Miles

Marine Corps Base Hawaii and Bellows Air Force Station

Oahu, Hawaii

Figure 2-4



EXPLANATION

- Installation Boundary
- RIMPAC Exercise Area

Wheeler Army Airfield Area



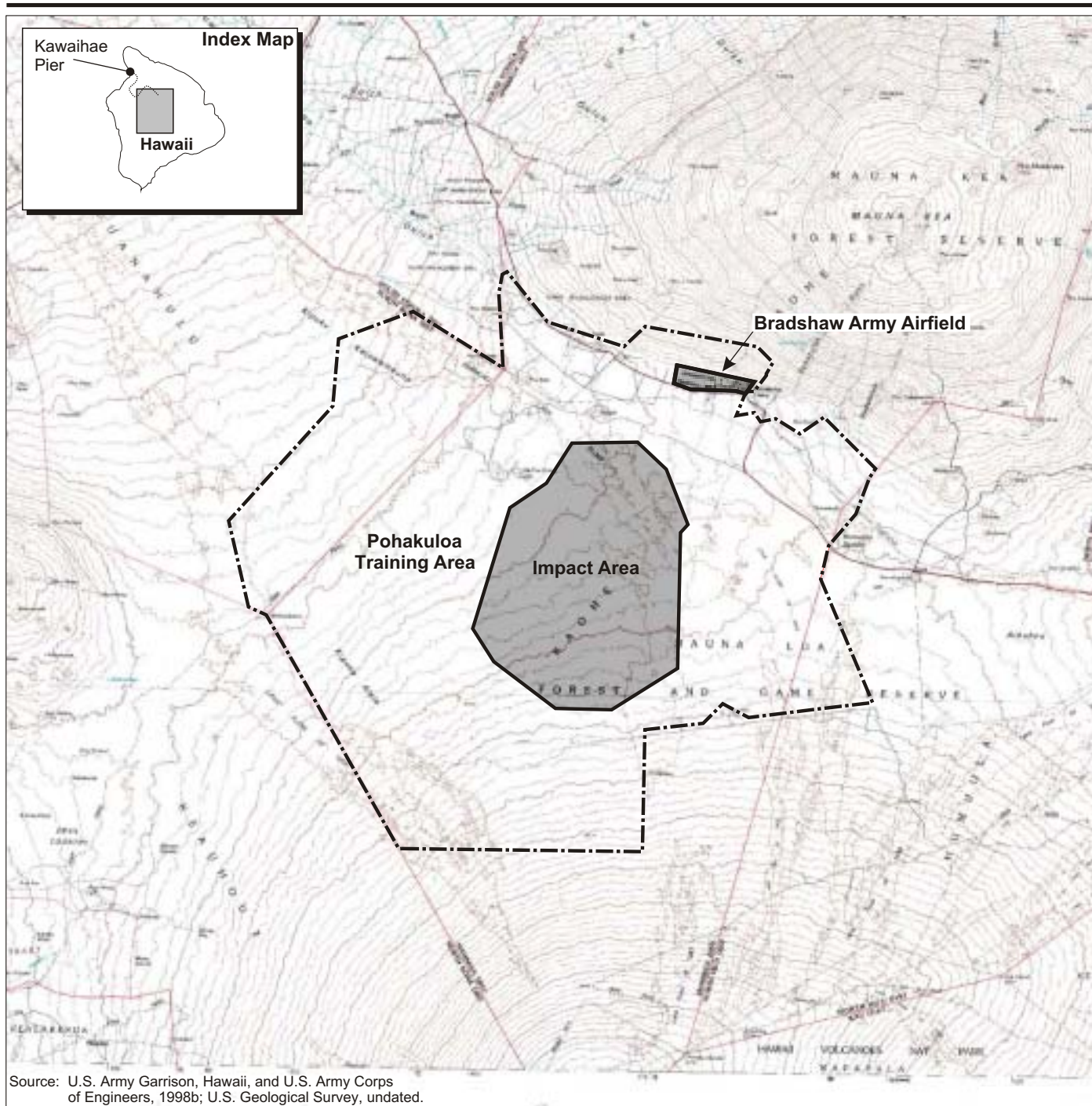
Scale 1:50,000

0 .65 1.3 Kilometers

0 .4 .8 Miles

Oahu, Hawaii

Figure 2-5



EXPLANATION

- Installation Boundary
- RIMPAC Exercise Area

Bradshaw Army Airfield and Pohakuloa Training Area



Scale 1:250,000

0 3.2 6.4 Kilometers

0 2 4 Miles

Hawaii, Hawaii

Figure 2-6

Assets—U.S. and foreign aircraft (fixed wing, rotary, and airship) would be supported from several locations. Approximately 63 aircraft participated in RIMPAC 2000, which included 46 at Hickam Air Force Base and 17 at Marine Corps Base Hawaii. The field at PMRF has also been used by units from the mainland. Housing would be provided at each installation. Future RIMPAC exercises could have as many as 260 aircraft. RIMPAC 02 would have as few as 30 total aircraft.

Land aircraft sorties could range from 300 to 2,600. Sea aircraft sorties could range from 25 to 2,000.

Location—Air operations support may be provided for RIMPAC activities from Hickam Air Force Base (figure 2-2), Coast Guard Air Station Barbers Point/Kalaeloa Airport (figure 2-7), Marine Corps Base Hawaii (figure 2-4), Wheeler Army Airfield (figure 2-5) on Oahu, Bradshaw Army Airfield (figure 2-6) on Hawaii, and PMRF (figure 2-3) on Kauai.

Coast Guard Air Station Barbers Point/Kalaeloa Airport (closed by the Base Realignment and Closure Act) (figure 2-7) could provide airship and or additional flightline capacity, if needed. The airship would be assembled at or near dry dock 4 at Pearl Harbor. Ford Island, within Pearl Harbor, could also be used as a temporary landing/anchorage site.

Duration—Air operations support for RIMPAC exercises will typically range from 20 to 57 days.

Standard Procedures—Numerous instructions based on laws and FAA and military regulations are in place at each installation governing ongoing aircraft operations. In addition, the OORDER for each RIMPAC exercise includes information on compliance requirements for aircraft operations. Any temporary operating airspace requirements for aircraft or targets would require additional coordination with the FAA. See insert on figure 2-1.

2.2.4 SURFACE-TO-AIR MISSILE EXERCISE (SAMEX)

Purpose—To provide realistic training and evaluation of surface ships and their crews in defending against enemy aircraft and missiles.

Description—Target drones representing enemy aircraft or missiles are flown or towed into the vicinity of the surface ship. The crew must identify the incoming object and respond with surface-to-air missiles as appropriate. There are two types of missiles. One type of missile is equipped with an instrumentation package, while the other type is equipped with a warhead. Recoverable target drones are refurbished and reused.

Assets—The exercise consists of one or more surface ships and/or submarines, one or more (20 to 50) target drones, and a helicopter and weapons recovery boat for target recovery.



EXPLANATION

 RIMPAC Exercise Area

Barbers Point Underwater Range/ Coast Guard Air Station Barbers Point/ Kalaeloa Airport

Oahu, Hawaii

Figure 2-7



Scale 1:50,000

0 .65 1.3 Kilometers
0 .4 .8 Miles

05-24-02 Barbers Point

RIMPAC Programmatic EA

Location—The surface-to-air missiles are launched from ships and/or submarines located within PMRF Warning Area W-188 (figure 2-8). Targets are launched from an existing ground-based target launch site at PMRF Launch Complex and/or Kauai Test Facility (KTF), PMRF (figure 2-3); from a Mobile Aerial Target Support System located in the open ocean within the PMRF Warning Areas; or released from an aircraft.

Duration—The exercise requires approximately 2 to 5 hours. RIMPAC 02 includes approximately 26 hours of SAMEX (based on nine events), but could actually last from 18 to 45 hours. RIMPAC 98 SAMEX was 15 hours. Future SAMEX could range from 8 to 60 hours.

Standard Procedures—Training exercises within the Hawaiian Fleet Operating Areas are conducted in accordance with Fleet Area Control and Surveillance Facility Pearl Harbor (FACSFACPH), Instruction 3120.1D, *Manual of Third Fleet Operating Areas*. PMRF and FACSFACPH maintain surveillance and coordinate scheduling of the Hawaiian Fleet Operating Areas to ensure maximum utilization, coordination, and safety. As shown in figure 2-8, PMRF is the using agency for Warning Areas W-186, W-188, and Restricted Airspace R-3101, and FACSFACPH is the using agency for Warning Areas W-187, W-189, W-190, W-191, W-192, W-193, W-194, W-196, and Restricted Airspace R-3107. The easternmost section of Warning Area W-188 (Rainbow) is coordinated between PMRF and FACSFACPH. Scheduling responsibilities for the air and surface space have been divided between PMRF and FACSFACPH as listed above for the using agency.

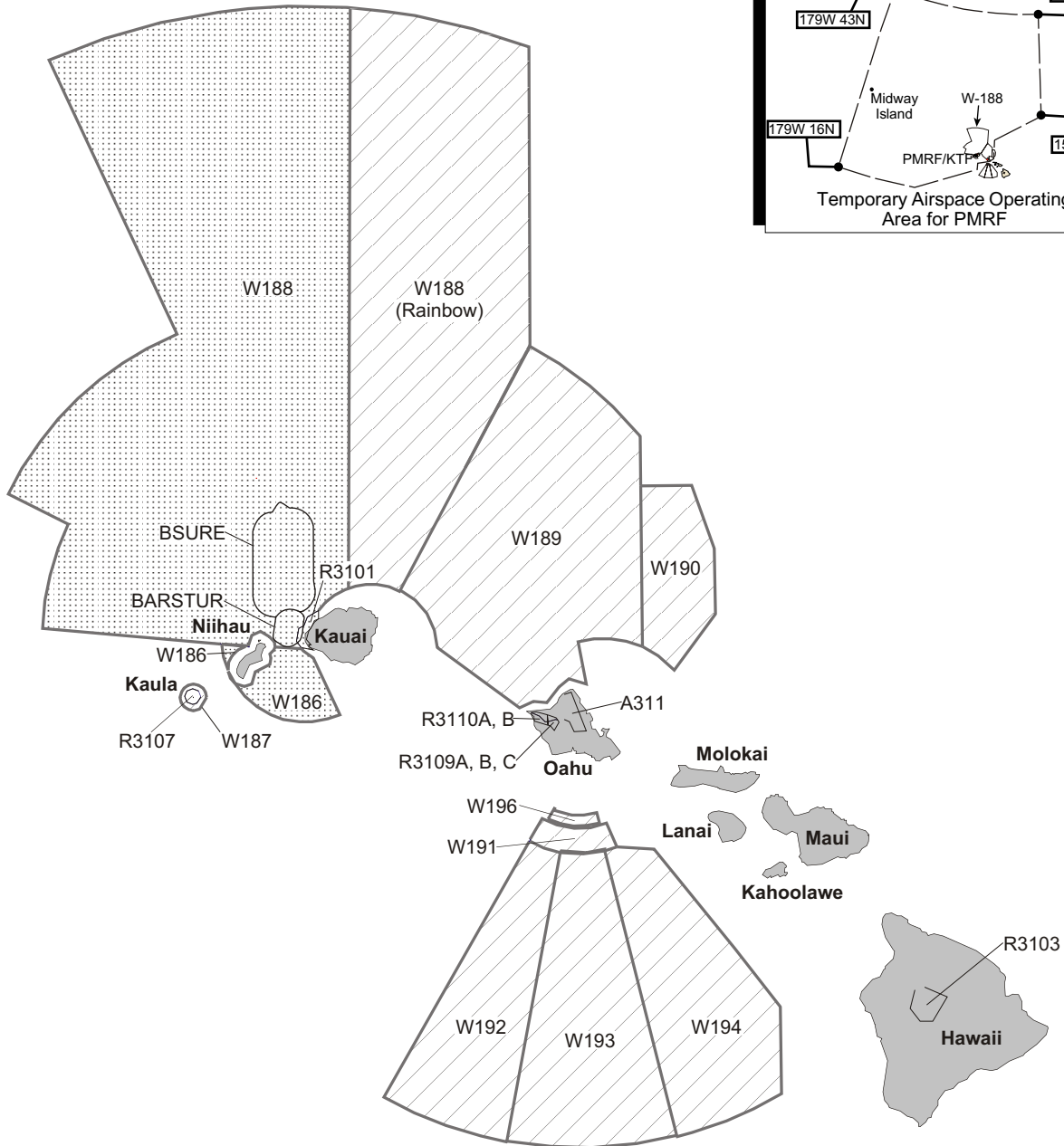
FACSFACPH Instruction 3120.1D includes a description of each operating area within the Hawaiian Fleet Operating Area that includes the location, description, type of exercises, authorized ordnance, altitude, periods of usage, scheduling authority, communications frequencies, and special instructions including protected species considerations and restrictions.

2.2.5 AIR-TO-AIR MISSILE EXERCISE (AAMEX)

Purpose—To provide aircrews with experience in using aircraft missile firing systems, and to develop new firing tactics.





Description—Jet target drones are launched from PMRF Launch Complex, KTF, or an aircraft controlled by PMRF. The targets are engaged by aircraft equipped with air-to-air missiles. The targets are tracked by the aircraft and then the air-to-air missiles are launched at the targets. Recoverable target drones and all recoverable elements are refurbished and reused.

Assets—Includes 1 to 6 jet target drones, 2 to 20 aircraft, 2 to 20 missiles and a weapons recovery boat for target recovery (Pacific Missile Range Facility, Barking Sands, 1998).



Source: National Imagery and Mapping Agency, 1997.

EXPLANATION

-  Land Area
-  Water Area
-  W Warning Area
-  R Restricted Airspace

For Descriptive Purposes:

PMRF Warning Areas Refers to:
W186, W188, R3101
Using Agency: Pacific Missile Range Facility

Oahu Warning Areas Refers to:
W187(Kaula), W188 (Rainbow), W189, W190,
W191, W192, W193, W194, W196, R3107(Kaula)
Using Agency: FACSAC Pearl Harbor

BSURE = Barking Sands Underwater
Range Expansion

BARSTUR = Barking Sands Tactical
Underwater Range

FACSAC = Fleet Area Control and
Surveillance Facility



Scale 1:4,800,000

0 61 122 Kilometers
0 38 66 Nautical miles

Existing Special Use Airspace, Sea Surface, and Underwater Ranges

Hawaiian Islands

Figure 2-8

Location—AAMEX activities are conducted within PMRF Warning Area W-188 (figure 2-8) Targets are launched from an existing ground-based target launch site at PMRF Launch Complex and/or KTF, PMRF (figure 2-3); from a Mobile Aerial Target Support System located in the open ocean within the PMRF Warning Areas; or released from an aircraft.

Duration—Each exercise typically lasts 2 to 6 hours. A total of approximately 24 hours of AAMEX would be included in RIMPAC. Future AAMEX could range from 2 to 30 hours.

Standard Procedures—The applicable procedures outlined in section 2.2.4 are also followed for AAMEX activities.

2.2.6 AIR-TO-SURFACE MISSILE EXERCISE (ASMEX)

Purpose—To provide a basic training situation for U.S. Air Force, U.S. Navy, U.S. Marine and multinational air groups in air-to-surface missile firing; conventional ordnance delivery including bombing (MK80 series bombs, live and inert), gunnery, and rocket and precision guided munitions firing; and close air support techniques.

Description—From 1 to 16 aircraft, carrying missiles and/or bombs (live and inert), rockets, precision guided munitions, or flying without ordnance (dry runs) are used during the exercise. At sea, Seaborne Powered Targets (SEPTARs) (occasionally a live bomb target), Improved Surface Towed Targets (ISTTs), excess ship hulks (live bombs), and a computer-generated island that is located within the Barking Sands Underwater Range Expansion (BSURE) are used as targets for inert bomb drops. The Naval Gunfire Scoring System (NGFSS) gathers data for scoring of surface ships and aircraft conducting gunnery and bombardment exercises within the Barking Sands Tactical Underwater Range (BARSTUR). On land, terrain features, constructed props, and/or tank hulks are used as targets. During recent RIMPACs there have been three to four environmentally cleaned ex-USS ships utilized as sinkable targets. When an exercise is scripted to utilize a combination of missiles to sink a target, the exercise is called a SINKEX.

Assets—ASMEX assets include helicopters and/or 1 to 16 fixed wing aircraft with air-to-surface missiles, anti-radiation missiles (electromagnetic radiation source seeking missiles), high-speed radiation missiles (electromagnetic radiation producing missiles that simulate radar and radio transmitters), and/or bombs (live and inert), rockets, or precision-guided munitions. When a Penguin medium-range anti-ship missile is used, the exercise is called a PENGUINEX (Pacific Missile Range Facility, Barking Sands, 1998). When a high-speed anti-radiation missile (HARM) is used, the exercise is called a HARMEX. Targets include SEPTARs, ISTTs, excess ship hulks, and simulated electronic targets at the BARSTUR and BSURE Ranges operated by PMRF. The BARSTUR and BSURE Ranges consist of passive bottom-mounted hydrophones, which detect water entry via the acoustic noise generated. The underwater tracking system detects the water impacts and directs the data to the NGFSS for scoring purposes.

Location—ASMEX exercise is typically conducted within PMRF Warning Area W-188 (figure 2-8)

Duration—Approximately 4 hours. A total of approximately 12 hours of ASMEX exercises are planned for RIMPAC. Future ASMEX could range from 4 to 35 hours. A SINKEX typically lasts 10 to 12 hours per target. Future SINKEX may include a separate day per hulk (4 to 6) extending the duration out as far as 40 to 72 hours.

Standard Procedures—At PMRF, the applicable procedures described in section 2.2.4 are followed for ASMEX.

Air-to-surface missile training at the Pohakuloa Training Area is confined to the special use airspace R-3103 associated with Bradshaw Army Airfield and the impact area associated with the Pohakuloa Training Area. Air activity is coordinated by Pohakuloa Training Area Range Control. For operations including 10 or more aircraft, the Bradshaw Army Airfield manager submits a Notice to Airmen (NOTAM) to Honolulu Flight Service Station to be published as a Honolulu Local NOTAM and as a Class D NOTAM. The Bradshaw Army Airfield manager provides this information to the airfield Air Traffic Information Service (U.S. Army Garrison Hawaii, 1996).

For missile and weapons systems, the Range Safety Office, Pohakuloa Training Area establishes criteria for the safe execution of the test operation in the form of Range Safety Approval and Range Safety Operational Plan documents. These plans are required for all weapon and target systems using Pohakuloa Training Area. The plans include the allowable launch and flight conditions and flight control methods necessary to contain the missile flight and impacts within the predetermined impact hazard areas. All hazard areas are checked and determined to be clear of nonessential personnel and aircraft prior to an exercise. Safety and health precautions are covered in the Pohakuloa Training Area, External Standing Operating Procedures and briefed by the Pohakuloa Training Area Operations Center (U.S. Army Garrison, Hawaii, 1996).

2.2.7 SURFACE-TO-SURFACE MISSILE EXERCISE (SSMEX)

Purpose—To provide basic training for fleet units in firing surface-to-surface missiles.

Description—The exercise involves one or more surface ships, submarines, and SEPTARs. The surface ships and/or submarines can operate as a single unit or as multiple fire units against the SEPTARs.

Assets—Includes 4 to 20 surface-to-surface missiles, SEPTARs, a weapons recovery boat, and a helicopter for environmental and photo evaluation. When a Harpoon anti-ship missile is used, the exercise is called a HARPOONEX. At sea, SEPTARs, ISTTs, excess ship hulks, and a computer-generated island that is located within the BSURE are used as targets for aircraft bomb drops. The NGFSS gathers data for scoring of surface ships and aircraft conducting gunnery and bombardment exercises within BARSTUR. On land, terrain features, constructed props, and/or tank hulks are used as targets. During recent

RIMPACs there have been three to four environmentally cleaned ex-USS ships utilized as sinkable targets. When an exercise is scripted to utilize a combination of missiles to sink a target, the exercise is called a SINKEK.

All missiles are equipped with instrumentation packages or a warhead. Surface-to-air missiles can also be used in a surface-to-surface mode.

Location—SSMEX activities are conducted within PMRF Warning Area W-188 (figure 2-8).

Duration—Each exercise typically lasts 2 hours. A total of approximately 10 hours of SSMEX exercises would be included in RIMPAC. Future SSMEX could range from 4 to 35 hours.

Standard Procedures—The applicable procedures outlined in section 2.2.4 are also followed for SSMEX activities.

2.2.8 ANTI-SUBMARINE WARFARE EXERCISE (ASWEX)

Purpose—To provide crews of anti-submarine ships, aircraft (including airships), submarines, and helicopters experience in locating and pursuing underwater targets and dropping inert torpedo weapons.

Description—The exercise involves locating and pursuing underwater targets and dropping inert torpedoes and inert air-dropped mines from anti-submarine aircraft and helicopters. Weapon recovery boats and helicopters are used to locate and recover the targets, torpedoes, and mines.

Assets—Includes ships, fixed wing aircraft, helicopters, torpedo targets, 1 to 10 submarines, and weapons recovery boats and/or helicopters. Five submarines will participate in RIMPAC 02. Weapons used encompass inert air-dropped mines, lightweight and heavyweight wire-guided inert long-range torpedoes launched from helicopters, aircraft, surface ships, and submarines. Sensors include sonars, non-acoustic sensors (sonobuoys), and airborne early warning radars.

Among the ships that will participate in RIMPAC 02 are Surveillance Towed Array Sensor System (SURTASS) units that utilize a passive array configuration. This system is only able to listen for submarines. Unlike the SURTASS Low Frequency Active (LFA) system, the passive unit does not project energy into the water. Should SURTASS LFA be used in the future, the same SURTASS vessels would be used to carry the SURTASS LFA systems. SURTASS LFA will not be on board any ship involved in RIMPAC 02. Should SURTASS LFA be planned for a future RIMPAC Exercise, compliance with all applicable environmental laws and regulations and appropriate coordination with federal and state agencies would occur before it could be used.

Location—ASWEX activities are conducted within PMRF Warning Area W-188, the Oahu Warning Areas (figure 2-8) and/or the open ocean.

Duration—ASWEX typically runs for 7 days. Several ASWEX are included in RIMPAC. Future ASWEX activities could range from 1 to 50 days.

Standard Procedures—The procedures outlined in section 2.2.4 are also followed for ASWEX. In addition, whenever aircraft use the ranges for ASWEX, the range clearance procedures include a detailed visual range search for marine mammals and unauthorized boats and planes by the aircraft releasing the inert torpedoes, range safety boats/aircraft, and range controllers.

The use of sonobuoys is generally limited to areas greater than 183 meters (100 fathoms, or 600 feet) in depth. Before dropping sonobuoys, the crew visually determines that the area is clear. Although the altitude varies at which buoys are dropped, the potential for drift during descent generally favors release at lower altitudes, where visual searches for marine mammals or sea turtles are more effective. When the sonobuoy is released, a small parachute (about 4 feet in diameter) retards its entry into the ocean. For operational reasons, the sonobuoy is designed to float on the surface and, after a controlled period of time (no longer than 8 hours), the complete package (with the parachute) will sink to the bottom.

2.2.9 AERIAL AND SUBMARINE MINING EXERCISE (MINEX)

Purpose—To provide practice with techniques for submarine-launched mobile mines and to provide a basis for crew qualification in aerial mining.

Description—The exercise involves one or more aircraft and both computer-simulated and inert exercise mines. Mine warfare exercises are limited to either the simulated laying of aircraft-deployed mines, where no actual mine ordnance is dropped, or the use of inert exercise mines or inert exercise submarine-deployed mines.

Assets—Aerial mining requires one or more aircraft. Submarine mining involves one or more submarines, divers, and a weapons recovery boat to recover the mines, and one or more helicopters.

Location—Aerial mining lines are generally developed off the southwest coast of Kauai and the southeast coast of Niihau, within PMRF Warning Areas W-186 and W-188. Submarine mining exercises are conducted within PMRF Warning Area W-188 (figure 2-8) Aircraft operations are conducted within R3101 (figure 2-8).

Duration—Aerial MINEX exercises last about 1 to 3 hours. Submarine MINEX may last up to 2 days. Future MINEX exercises could range from 1 to 4 days.

Standard Procedures—The applicable procedures discussed in section 2.2.3 are followed for MINEX activities. The use of inert exercise mines is generally limited to areas greater than 183 meters (100 fathoms, or 600 feet) in depth. Before dropping inert exercise mines, the crew visually determines that the area is clear. Although the altitude at which inert exercise mines are dropped varies, the potential for drift during descent generally favors release at lower altitudes, where visual searches for marine mammals are more effective. When the inert exercise mine is released, a small parachute retards its entry into the ocean. The mine can be designed to float on the surface or near surface or to sink on a tether. Ultimately the mine would sink carrying the parachute with it. Standard Navy procedures would be followed for the deployment of inert mines from submarines.

2.2.10 SHIP MINE WARFARE EXERCISE (SMWEX)

Purpose—To allow surface ship sonar operators to train in shallow-water environments. Mine detection helicopter sonar operators can also train in this area.

Description—Two types of exercises are included. The first type is a structured exercise where PMRF tracking systems would monitor passing ships. Tracking data combined with shipboard or helicopter acquired data would provide the basis for analysis of the exercise. In the second type of exercise, a ship would traverse seaward of the buoy field and attempt to detect the buoys without monitoring. This type of exercise would occur when ships enter or depart PMRF instrumented areas for other exercises.

Assets—The mine warfare training area is approximately 1.6 kilometer (1 mile) off shore and consists of 10 buoys in 2 columns oriented north-south (figure 2-3). Each buoy is 94 centimeters (37 inches) in diameter and moored to the sea floor by a wire rope. The ocean depth varies between 45.7 and 107 meters (150 and 350 feet), and the buoys are at least 15 meters (50 feet) below the ocean surface. Various marine and aerial assets, capable of tracking underwater objects over a 2,590-square-kilometer (1,000-square-mile) area, would be used during the structured exercise. In the second type of exercise, only shipboard assets would be used.

Location—The mine warfare training area is located between 1.2 and 2 kilometers (0.75 and 1.25 miles) from shore and is adjacent to the PMRF Shallow Water Training Area (figure 2-3).

Duration—SMWEX can range from 3 hours to as much as 72 hours, but generally lasts approximately 2 to 3 hours. Future SMWEX could be extended up to 72 hours.

Standard Procedures—The procedures outlined in section 2.2.4 are also followed for SMWEX. In addition, annual maintenance/inspection of the sonar objects would be conducted before the start of the humpback whale season. Before the humpback whale season (maximum range is from September through May) (National Oceanic and Atmospheric Administration, 2002), divers or a remotely piloted vehicle would be used to remove any foreign material that could pose an entanglement hazard. Visual observation would be used to detect/locate marine mammals and sea turtles.

2.2.11 STRIKE WARFARE EXERCISE (STWEX) AND CLOSE AIR SUPPORT EXERCISE (CASEX)

Purpose—To provide a basic training situation for U.S. Air Force, U.S. Navy, U.S. Marine and multinational air groups in air-to-surface missile firing; conventional ordnance delivery including bombing (MK80 series bombs, live and inert), gunnery, and rocket and precision guided munitions firing; and close air support techniques.

Description—From 1 to 16 aircraft, carrying missiles and/or bombs (live and inert), rockets, precision guided munitions, or flying without ordnance (dry runs) are used during the exercise. At sea, excess ship hulks and a computer-generated island that is located within the BSURE are used as targets for aircraft missile firing and bomb drops. The NGFSS gathers data for scoring of surface ships and aircraft conducting gunnery and bombardment exercises within the BARSTUR. On land, terrain features, constructed props, and/or tank hulks are used as targets.

Air crews conduct STWEX in conjunction with ground or airborne forward air controllers.

Assets—STWEX assets include helicopters and/or 1 to 16 fixed wing aircraft with air-to-surface missiles, anti-radiation missiles (electromagnetic radiation source seeking missiles), high-speed radiation missiles (electromagnetic radiation producing missiles that simulate radar and radio transmitters), and/or bombs (live and inert), rockets, or precision-guided munitions. Targets include excess ship hulks, and simulated electronic targets at the BARSTUR and BSURE Ranges operated by PMRF. The BARSTUR and BSURE Ranges consist of passive bottom-mounted hydrophones, which receive signals from pingers mounted internally on the exercise rounds and submarines. The underwater tracking system detects the water impacts and directs the data to the NGFSS.

Location—STWEX, and CASEX exercises are conducted within Oahu Restricted Airspace R-3107 (Kaula—inert only) and Warning Area W-187 (Kaula—inert only) and PMRF Warning Area W-188 (figure 2-8) PMRF, Kauai, and the Pohakuloa Training Area on Hawaii (figure 2-6).

Duration—Approximately 4 hours. A total of approximately 12 hours of STWEX exercises are planned for RIMPAC. Future STWEX could range from 4 to 35 hours.

Standard Procedures—Air-to-surface missile training at the Pohakuloa Training Area is confined to the special use airspace R-3103 associated with Bradshaw Army Airfield and the impact area associated with the Pohakuloa Training Area. Pohakuloa Training Area Range Control coordinates air activity. For operations including 10 or more aircraft, the Bradshaw Army Airfield manager submits a NOTAM to Honolulu Flight Service Station to be published as a Honolulu Local NOTAM and as a Class D NOTAM. The Bradshaw Army Airfield manager provides this information to the airfield Air Traffic Information Service (U.S. Army Garrison Hawaii, 1996).

For missile and weapons systems, Pohakuloa Training Area Safety Office establishes criteria for the safe execution of the test operation in the form of Range Safety Approval and Range Safety Operational Plan documents. These plans are required for all weapon and target systems using Pohakuloa Training Area. The plans include the allowable launch and flight conditions, and flight control methods necessary to contain the missile flight and impacts within the predetermined impact hazard areas. All hazard areas are checked and are determined to be clear of nonessential personnel and aircraft prior to an exercise. Safety and health precautions are covered in the Pohakuloa Training Area, External Standing Operating Procedures and are briefed by the Pohakuloa Training Area Operations Center (U.S. Army Garrison, Hawaii, 1996). Similar procedures are employed at PMRF (see section 2.2.4).

2.2.12 GUNNERY EXERCISE (GUNNEX)

Purpose—To provide gunnery practice for surface vessel crews against both stationary and moving targets.

Description—Gunnery training operations involve the use of highly automated guns against surface (land, excess vessel hulks [see SINKEX], and simulators) or aerial targets. Crews respond to threats from air attack and surface-skimming missiles that require extremely fast reaction times and a heavy volume of fire. Ships fire inert exercise rounds, and aircraft fire inert exercise rounds and drop inert exercise bombs at stationary targets on Kaula and at the computer-generated island located within BSURE (PMRF Warning Area W-188).

Assets—The exercise involves 1 to 10 surface vessels, observation helicopters, SEPTARs, ISTTs, orange buoys, towed aerial targets, excess ship hulks, jet aerial targets, and the BSURE. Ship-deployed and air-deployed weapons systems are used, ranging from 20-millimeter to 5-inch caliber guns.

Location—GUNNEX activities are conducted within PMRF Warning Areas W-186 and W-188, Oahu Warning Areas W-187 (Kaula), W-194, and Restricted Airspace R-3107 (Kaula) (figure 2-8).

Duration—Typically 1 to 8 hours. A total of approximately 15 hours of GUNNEX exercises are planned for RIMPAC 02. Future GUNNEX could range from 5 to 50 events over 1 to 100 hours.

Standard Procedures—The applicable procedures described in section 2.2.4 are followed for gunnery exercises.

2.2.13 SINKING EXERCISE (SINKEX)

Purpose—To train personnel and test weapons against a full-size ship.

Description—Each SINKEX uses an excess vessel hulk as a target that is eventually sunk during the course of the exercise. Any exercise that normally uses a surface target, such as an ASMEX, can be a part of the SINKEX. The hulk ship is towed to a designated location where various platforms would use multiple types of weapons to fire shots at the hulk. Platforms can consist of air, surface, and subsurface elements. Weapons can include missiles, precision and non-precision bombs, gunfire and torpedoes. If none of the shots result in the hulk sinking, either a submarine shot or placed explosive charges would be used to sink the ship. Charges ranging from 45 to 90 kilograms (100 to 200 pounds), depending on the size of the ship, would be placed on or in the hulk.

Assets—The vessels used as targets are selected from a list of U.S. Environmental Protection Agency (EPA) approved destroyers, tenders, cutters, frigates, cruisers, tugs, and transports (Department of the Navy and U.S. Environmental Protection Agency, 1996). Examples of missiles that could be fired at the targets include AGM-142 from a B-52 bomber, Walleye AGM-62 from FA-18 aircraft, and a Harpoon from a P-3C aircraft. Surface ships and submarines may use either torpedoes or Harpoons, surface-to-air missiles in the surface-to-surface mode, and guns. Other weapons and ordnance could include, but are not limited to, bombs, Mavericks, Penguins, and Hellfire. SINKEX vessels can number from one to six per RIMPAC.

Location—SINKEX is conducted at an approved site (minimum depth 1,800 meters [5,905 feet], at least 93-111 kilometers [50-60 nautical miles] northwest from shore) within PMRF Warning Area W-188 (figure 2-8).

Duration—The exercise generally lasts 3 to 8 hours. Three SINKEX are planned for RIMPAC 02. Future SINKEX could range from one to six.

Standard Procedures—The applicable procedures described in section 2.2.4 are followed for SINKEX. In addition, vessels that are used must have all hazardous material removed and be approved by EPA in accordance with the memorandum of agreement and the SINKEX permit (40 CFR 220-225, 227-229).

2.2.14 LIVE FIRE EXERCISE (LFX)

Purpose—LFX provides ground troops with live-fire training and combined arms live-fire exercises training, including aerial gunnery and artillery firing. This benefits ground personnel by receiving semi-realistic training.

Description—These exercises can include platoon troop movements through numerous target objectives with various weapons. Aerial gunnery exercises and artillery and mortar exercises are also conducted as part of combined and separate exercises. Live fire and blanks are used. Blanks are used outside of defined impact areas.

Assets—LFX typically consists of ground troops and special forces, including a sniper unit, of about 2 to 18 people, a helicopter, artillery, mortars, and miscellaneous small arms. In the future, up to a brigade of U.S. or foreign troops could receive LFX training during a

RIMPAC exercise. This exercise would require the installation of a recycling washrack at Kawaihae Pier (K-Pier) to comply with EO 13112 primarily for foreign country vessels.

Location—LFX operations would be conducted at Pohakuloa Training Area. However, LFX would not be conducted at Pohakuloa Training Area for RIMPAC 02. Live fire exercises at Pohakuloa Impact Area (figure 2-6) in conjunction with STWEX and CASEX are discussed in section 2.2.11.

Limited LFX can be conducted at Makua Military Reservation (figure 2-9) under a court-approved settlement plan of 4 October 2001. No RIMPAC exercises are planned at Makua Military Reservation during RIMPAC 02 or RIMPAC 04. Any activities proposed for Makua Military Reservation at subsequent RIMPACs will need to be reviewed by the U.S. Army before such exercises are conducted.

Duration—The exercise generally lasts 1 to 24 hours. A total of 10 days of exercises are planned for RIMPAC 02.

Standard Procedures—The initial step is an extensive planning process that includes coordination meetings 8 weeks and 30 days before the exercise, a written plan of maneuver and fire support, and a risk assessment of the exercise.

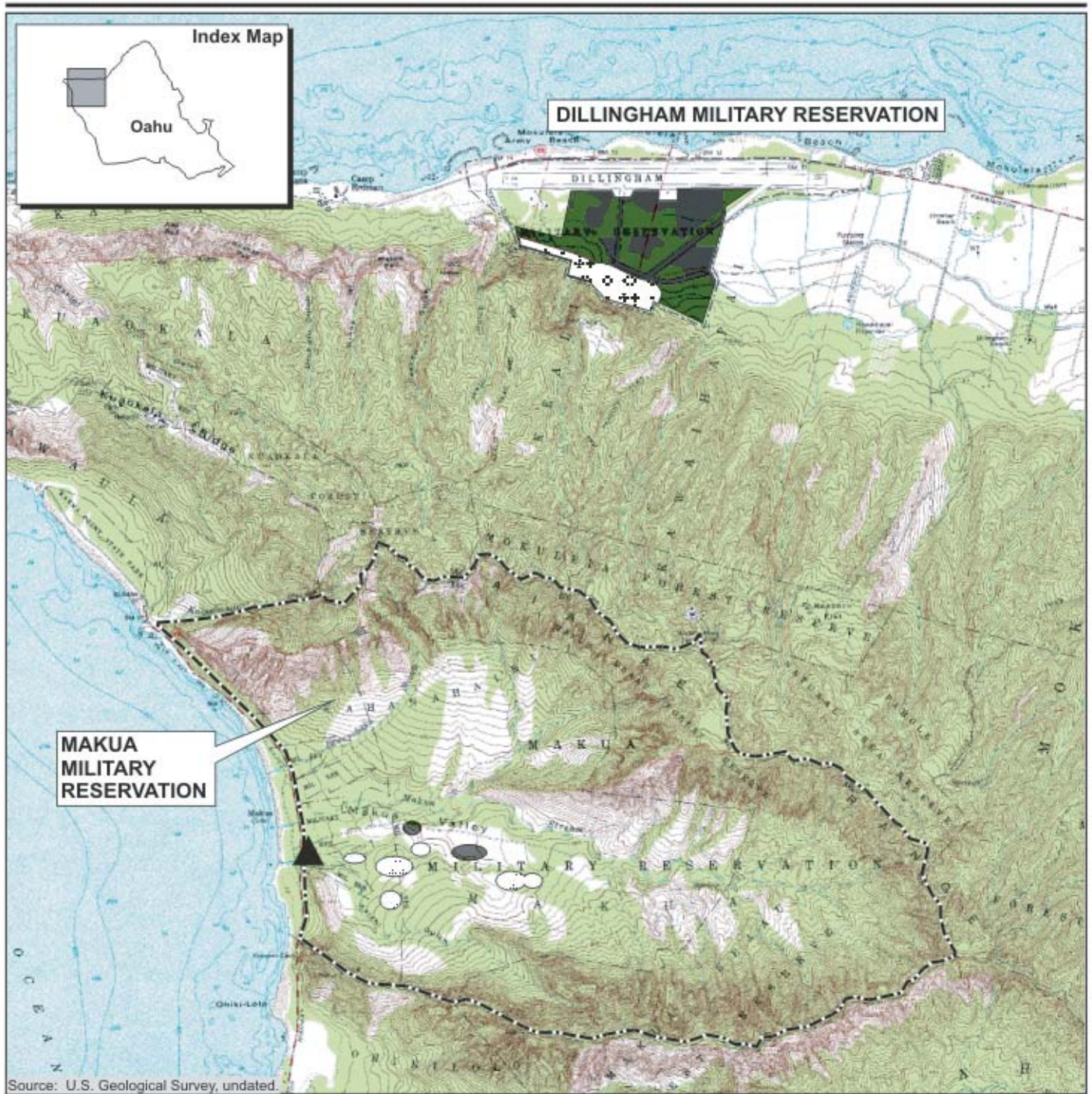
All live fire exercises at Makua are conducted in accordance with U.S. Army procedures.

2.2.15 HUMANITARIAN ASSISTANCE OPERATION/NON-COMBATANT EVACUATION OPERATION (HAO/NEO)

Purpose—To provide training in implementing humanitarian assistance in an increasingly hostile setting, ultimately requiring evacuation of personnel and troops.

Description—HAO/NEO training exercises involve approximately 150 personnel and troops and specialists who initially provide assistance to civilians and then evacuate the civilians when necessary. This scenario could also be used to simulate a prisoner-of-war camp or place where people are interned. Groups could be interrogated and housed before shipping to another location. Direct action is also included in the HAO/NEO description because it involves a similar number of troops. The direct action exercise is much quicker and involves approximately 50 personnel and 150 troops who gain access to an area by boat or helicopter, storm the location, recover the mission target, and return to their units.

Assets—HAO/NEO exercises use trucks, helicopters, Landing Craft, Air-cushion (LCAC), Utility (LCU) and/or Combat Rubber Reconnaissance Craft (CRRC) to shuttle supplies. Evacuations may be made using helicopters, and/or LCAC vehicles. Direct actions may use CRRCs, Rigid Hull Inflatable Boats (RHIBs), trucks, and/or helicopters. See section 2.2.20 for a description of the CRRC, RHIB, LCAC, and LCU. Existing building and facilities are utilized to the extent practicable, but in some instances, tents and other temporary structures may be utilized.



EXPLANATION

- Installation Boundary
- RIMPAC Exercise Area
- Sensitive Ecological Area Within the RIMPAC Exercise Area
- ▲ Reconnaissance Insert Location



Scale 1:50,000



Dillingham/Makua Area

Oahu, Hawaii

Figure 2-9

Location—Marine Corps Base Hawaii (figure 2-4) is used for HAO/NEO and direct action training. Marine Corps Training Area Bellows/Bellows Air Force Station and Kahuku Training Area could also be used for HAO/NEO. HAO/NEO is not scheduled for RIMPAC 02.

Duration—The HAO/NEO exercise lasts for approximately 4 days. The direct action exercise would be several hours.

Standard Procedures—The HAO/NEO exercise typically takes place at existing buildings and facilities. For example, on Marine Corps Base Hawaii existing designated areas of Hale Koa/West Field beach would be used for helicopters and the LCAC landings. RIMPAC participants would use training overlays that identify the landing area and any nearby restricted areas or sensitive biological and cultural resource areas in the vicinity of the exercise.

2.2.16 HUMANITARIAN ASSISTANCE/DISASTER RELIEF (HA/DR)

Purpose—To provide training in responding to a United Nations request for complex emergency support.

Description—HA/DR training exercises involve approximately 125 to 250 troops and 125 to 200 refugees. An amphibious landing craft would off-load approximately 4 transport trucks, 3 support vehicles, 3 water supply vehicles, water and food supply, and 125 troops. They would travel along authorized highways to the HA/DR site. A safe haven camp would be established in existing facilities or temporary facilities (tents, etc.). There will be two sites for each exercise, a refugee camp and a Civil–Military Operations Center area. There will be roughly 30 five-person Red Cross tents within the refugee camp, with a few larger tents for various support functions including meals, showers, recreation, administration, and storage. The Civil–Military Operations Center section will contain more storage, communication links, staff housing, experimentation (including information management in an austere environment, high-bandwidth informatics support, interviewing of refugees for war-crimes documentation using digital transcription, and solar powered computer systems), and various public relations areas for visitors. Approximately 18 portable latrines would be at the sites. Buses and/or trucks would be needed to transport refugees. Military helicopters could also be used.

HA/DR training exercises will not occur during RIMPAC 02.

Assets—HA/DR exercises would include approximately four transport trucks, three support vehicles, three water supply vehicles, and seven buses. Additional requirements include:

HA

- Roughly 30 each, five-person Red Cross tents—(no utilities)
- A shower unit
- A Marine Medical unit
- Portable latrines
- Kitchen
- Dining facility
- Recreation
- Administration facility
- Bulk commodities
- Marine Combat Service Support Group staff housing
- Graded 4WD access road
- Force protection
- Media and experiment support

DR

- Water and water storage for up to 250 people (7-day capacity)
- Meals (tray-pack 3 times a day) for 250 people (7-day capacity)
- Portable latrines for 250 people (7-day capacity)
- Shower services for 250 people (7-day capacity)

Location—A safe haven refugee camp would be established within the Marine Corps Base Hawaii, Marine Corps Training Area Bellows/Bellows Air Force Station and/or Kahuku Military Training Area (figure 2-10). An amphibious landing craft or trucks would offload equipment, vehicles, troops, and refugees. Airstrips at the above locations could be used to transport personnel.

Duration—The HA/DR exercise lasts for approximately 10 days. Future HA/DR exercises could range from 2 to 18 days. The camp would be established in 2 days. Approximately 125 to 250 refugee actors would be provided water, shelter, food, sanitation, and communications for 5 days. Takedown would last about 2 days. HA/DR training exercises will not occur during RIMPAC 02.

Standard Procedures—The HA/DR exercise takes place near an existing training trail. The access road to the site would be graded before the exercise, if required. Grading would be within the existing roadway in accordance with standard procedures. Equipment and

personnel would be transferred to the camp location via transport trucks and buses, respectively. Training overlays that identify the transit route, camp location, and any nearby restricted areas or sensitive biological and cultural resource areas would be used by the RIMPAC participants.

2.2.17 SPECIAL WARFARE OPERATIONS (SPECWAROPS)

Purpose—To provide covert insertion and reconnaissance training for small Special Warfare units.

Description—SPECWAROPS are performed by the U.S. Navy and the U.S. Marines. Some of the terminology used is different, but the types of activities are similar. The U.S. Marine terms are in parentheses. Activities include special reconnaissance (SR) (reconnaissance and surveillance [R&S]) Combat Search and Rescue (CSAR) (helicopter raids, boat raids), and Direct Action (DA) Tactical Recovery of Aircraft and Personnel (TRAP). SR (R&S) units consist of small special warfare unit and utilize helicopters, submarines, and CRRC to gain covert access to military assets, gather intelligence, stage raids, and return to their host units. Reconnaissance inserts and beach surveys are often conducted before large-scale amphibious landings and can involve several units gaining covert access using a boat. CSAR (TRAP) operations are similar to SR (R&S), but the mission is to locate and recover a downed aircrew. DA missions consist of an initial insertion, followed by the helicopters/boats inserting additional troops to take control of an area. The helicopters may land for refueling.

Assets—SR (R&S), CSAR (boat raid), and DA (TRAP) assets include helicopters, submarines, and CRRC. Helicopter inserts (raids) are composed of three to six helicopters. Units can range from 2 to 20 troops.

Location—Amphibious insertions are conducted at PMRF, Niihau, and Kahuku Beach, Oahu (figure 2-10) and K-Pier, Hawaii. Inserts from helicopter take place at Bradshaw Army Airfield (figure 2-6), Makua Military Reservation (figure 2-9), and Kahuku Military Training Area (figure 2-10), Dillingham Military Reservation, and Wheeler Army Airfield. Port Allen, Kauai (figure 2-1) and Marine Corps Base Hawaii, Oahu (figure 2-4) are used to stage boat raids, and Makaha Ridge-PMRF, Niihau, Bradshaw Army Airfield and Dillingham Military Reservation are used for helicopter raids and downed pilot training. Similar activities are conducted at Pearl Harbor including Ford Island and various underwater ranges, Coast Guard Air Station Barbers Point/Kalaheo Airport, Oahu, Hickam Air Force Base, Marine Corps Training Area Bellows/Bellows Air Force Station, and Pohakuloa Training Area. Also activities occur within the Oahu and PMRF Warning Areas as well as in the open ocean.

No RIMPAC exercises are planned at Makua Military Reservation (figure 2-9) during RIMPAC 02 or RIMPAC 04.

Duration—SPECWAROPS activities last from several hours to several days. Future SPECWAROPS could range from 2 to 57 days.

Standard Procedures—The purpose of most special warfare exercises is to operate undetected. The exercises generally involve fewer than 20 troops and have minimal interaction with the environment. During amphibious inserts the crews follow established procedures, such as having a designated lookout watching for other vessels, obstructions to navigation, marine mammals (whales or monk seals), or sea turtles. The troops will review training overlays that identify the insertion points and any nearby restricted areas. Sensitive biological and cultural resource areas are avoided by the SPECWAROPS troops (Pohakuloa Training Area, External Standing Operating Procedures, Annex T—Environmental; and table 4-2, Training Guidelines for Resource Protection—All Oahu Training Areas). (U.S. Army Garrison, Hawaii, and U.S. Army Corps of Engineers, 1997a)

2.2.18 UNDERWATER DEMOLITION EXERCISES (DEMO)

Purpose—To provide training in the identification and destruction or neutralization of inert ground mines and floating/moored mines and possibly excess ship hulks.

Description—DEMO exercises are mainly training in the detection and explosive attack of inert, underwater mines. Tactics against ground or bottom mines involve the diver placing a specific amount of explosives, which when detonated underwater at a specific distance from a mine results in neutralization of the mine. Floating, or moored, mines involve the diver placing a specific amount of explosives directly on the mine. Floating mines encountered by fleet ships in open-ocean areas will be detonated at the surface.

In support of an amphibious assault, divers and U.S. Navy marine mammal assets deploy in very shallow water depths (3 to 12 meters [10 to 40 feet]) to locate mines and obstructions.

Assets—Divers are transported to the mines by boat or helicopter. Inert dummy mines are used in the exercises. The total net explosive weight used against each mine ranges from less than 0.5 kilogram to 9 kilograms (less than 1 pound to 20 pounds).

Various types of surveying equipment may be used during RIMPAC. Examples include the Canadian Route Survey System that hydrographically maps the ocean floor using multi-beam side scan sonar and the Bottom Object Inspection Vehicle used for object identification. These units can help in supporting mine detection prior to SPECWAROPS and amphibious exercises.

As part of RIMPAC, the U.S. Navy's Very Shallow Water Mine Countermeasures Detachment of Commander Mine Warfare Command will deploy trained Atlantic bottlenose dolphins (*Tursiops truncatus*) of their marine mammal mine-hunting systems in several missions. Each mission will include up to four motorized small craft, several crew members and a trained dolphin. Each trained animal is deployed under behavioral control.

Location—These activities take place offshore in the Pu'uloa Underwater Range (called Keahi Point in prior RIMPAC EAs), Pearl Harbor (figure 2-2); Iroquois Land/Underwater

Range within Pearl Harbor (figure 2-11); Barbers Point Underwater Range off-shore of Coast Guard Air Station Barbers Point/Kalaheo Airport (formerly Naval Air Station [NAS] Barbers Point) (figure 2-7); and PMRF, Kauai (Majors Bay area) (figure 2-3); PMRF and Oahu Training Areas; and in open-ocean areas.

Duration—Each demolition activity generally last 1 to 4 hours. Future demolition activities could range from 1 to 30 events per RIMPAC.

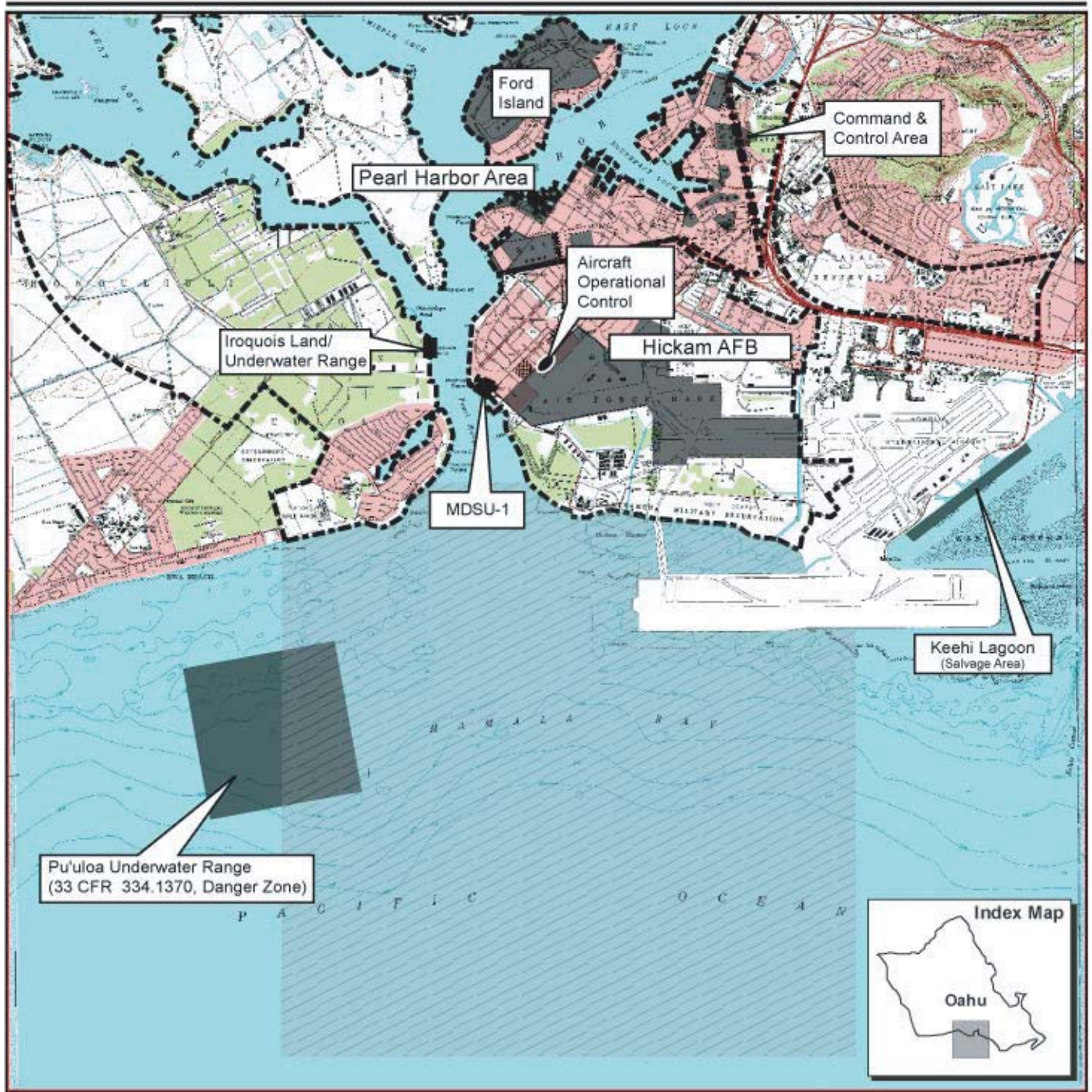
Standard Procedures—All demolition activities are conducted in accordance with Commander Naval Surface Forces Pacific (COMNAVSURFPAC) Instruction 3120.8D, *Procedures for Disposal of Explosives at Sea/Firing of Depth Charges and Other Underwater Ordnance* (Department of the Navy, 1993). Before any explosive is detonated, divers are transported a safe distance away from the explosive and a thorough search is made of the area to identify marine mammals or sea turtles. If any are seen, the exercise is delayed until the animals leave the area. Standard practices for tethered mines in Hawaiian waters require ground mine explosive charges to be suspended 3 meters (10 feet) below the surface of the water. For mines on the shallow water floor (less than 40 feet of water), only sandy areas that avoid/minimize potential impacts to coral would be used for explosive charges. After exercises involving underwater detonations, the area would be searched for injured animals.

Exercises using dolphins are coordinated with other U.S. Navy units through preplanning and active communications in order to avoid conflicts with other U.S. Navy activities, underwater acoustic emissions associated with those activities, or civilian craft. Any unplanned situation that has the potential for exposing a dolphin to dangerous or conflicting underwater acoustic emissions or other interference is mitigated by recalling it into a small craft and moving the dolphin out of the area. As such, these marine mammals are continuously protected. Transportation of these animals into the State of Hawaii and housing there will be in accordance with the regulations of the Hawaii State Department of Agriculture.

2.2.19 SALVAGE OPS

Purpose—To provide a realistic training environment for fire at sea, de-beaching of ships, and harbor clearance operations training by U.S. Navy diving and salvage units.

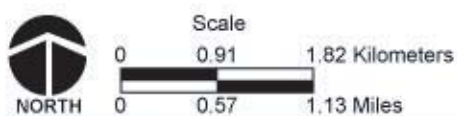
The purpose of incorporating ship salvage, towing, and harbor clearance scenarios into RIMPAC and other Pacific Fleet Area of Responsibility exercises is to strengthen the capabilities of U.S. and coalition Naval salvage forces and bolster the response to real world contingencies. Additionally, exercising these operational capabilities within the Multi-National Force Task Force Command and Control infrastructure provides U.S. and coalition Naval salvage forces the opportunity to improve critical interoperability skills.



EXPLANATION

- Installation Boundary
 - RIMPAC Exercise Area
 - Pearl Harbor Naval Defensive Sea Area
- AFB = Air Force Base
MDSU-1 = Mobile Diving and Salvage Unit One

Iroquois Land and Underwater Range/ Pu'uloa Underwater Range/Keehi Lagoon



Oahu, Hawaii

Figure 2-11

Description—The U.S. Navy’s Mobile Diving and Salvage Unit One (MDSU-1) and divers from other countries would practice swift and mobile ship and barge salvage, towing, battle damage repair, deep ocean recovery, harbor clearance, removal of objects from navigable waters, and underwater ship repair capabilities. In RIMPAC 02, MDSU-1 plans to remove two old barges from the seaplane channel in Keehi Lagoon in cooperation with the State of Hawaii. The Hawaii Department of Land and Natural Resources has surveyed the barges and determined they do not appear to contain or hazardous substances (Naval Base Pearl Harbor and State of Hawaii, 1996). These sunken barges would be cut into pieces, placed on salvage barges and salvaged as scrap metal. Turbidity control devices would not be required since only small sections of the barges would be moved at any one time. A towboat would be set afire using wooden pallets and the fire would be extinguished within the Pu’uloa Underwater Range. The towboat would also be run aground inside Pearl Harbor and refloated. Some ships participating in RIMPAC would be used for simulated battle damage surveys and repair plan development. Deep ocean recovery would involve dives on existing wrecks in the Pu’uloa Underwater Range outside of the entrance to Pearl Harbor.

Throughout RIMPAC 02 through 10, U.S. Naval and coalition diving and salvage forces will exercise the following capabilities:

- SCUBA and surface supplied air and mixed gas (HeO₂) diving operations to depths of 91 meters (300 feet) of sea water
- Hyperbaric recompression chamber operations
- Underwater ship inspection, husbandry, and repair of coalition Naval ships and submarines
- Underwater search and recovery operations
- Underwater cutting employing hydraulic, pneumatic, and oxy-arc powered tools
- Underwater welding
- Removal of petroleum, oil, and lubricants (POL) exercising various POL offload techniques
- Restoring Buoyancy (Survey, Patch, De-water) to restore buoyancy to a grounded or sunken vessel or object of value
- Harbor clearance for clearance or removal of derelict vessels or other obstructions from navigable waterways and berthing
- Off-Ship fire fighting to simulate providing rescue and assistance at sea to condition Naval combatants battling fires

Assets—MDSU-1 divers, Underwater Construction Team TWO, *USS Safeguard* (ARS 50) *USS Salvor* (ARS 52), and all Pacific Fleet Ocean going Tugs (T-ATF) may be among the U.S. Naval salvage forces operating/exercising in support of RIMPAC and other salvage and harbor clearance exercises. In conjunction with U.S. Naval salvage forces, Royal Australian Naval and Canadian Naval diving and salvage forces may participate. Divers would utilize a variety of water craft and associated equipment to remove the barges from

the lagoon channel to include barges with cranes, shuttle boats, underwater metal cutting equipment (such as torches and chains), generators, pumps, and diving equipment.

Location—These activities take place at Pu'uloa Underwater Range (called Keahi Point in prior RIMPAC EAs), Pearl Harbor (figure 2-2), and Keehi Lagoon, Oahu (figure 2-11). Staging for these activities would be from the MDSU-1 Facility located on Bishop Point, an annex of Pearl Harbor, on the southwestern side of Hickam Air Force Base, Oahu.

These activities may take place at Pu'uloa Underwater Range (called Keahi Point in prior RIMPAC EAs), Pearl Harbor (figure 2-2), and Keehi Lagoon, Oahu. To capitalize on real-world training opportunities and to provide mutual benefit for both the U.S. Naval and coalition Salvage Force and for the State of Hawaii, salvage training and harbor clearance exercises may take place in any of the shoal waters, harbors, ports, and in-land waterways throughout the Hawaiian Operating Area.

Duration—The ship fire exercise will last no more than 1 day per event. De-beaching activities would last no more than 1 to 2 days per event. Deep ocean recovery exercises could last up to 2 weeks and could be longer depending on the availability of missions.

The duration of salvage exercises will vary considerably. For a fire at sea or ship retraction of a grounded vessel using the ex-*USS Navigator*, the exercise may last 1 and up to 4 days respectively. For underwater cutting, welding, pumping, restoring buoyancy, and exercises that practice a single skill in a controlled or ex-scenario environment, the event will usually not exceed 1 day. However, multiple iterations may extend throughout the duration of the exercise.

Harbor clearance projects or the effort to search and recover an aircraft or other object of value may last 2 weeks or longer, forcing cessation of the exercise upon completion of RIMPAC 02 and resumption of the exercise at RIMPAC 04.

Standard Procedures—To ensure diver safety, all operations are conducted in accordance with *The U.S. Navy Diving Manual*. This manual, which is based on the U.S. Navy's long history of conducting diving operations, provides the latest procedures and equipment as well as the required equipment and procedures for using surface-supplied diving equipment as well as the requirements for emergency gas supply equipment that is used for enclosed space diving. The U.S. Navy would establish a surface safety zone around the diving and salvage operations to ensure diver safety. Operating procedures and emergency situations. In addition a Diving Medical Officer or certified personnel would be onboard the diving support vessel as appropriate. Standby divers would be available at all times to render emergency assistance. Divers would be trained in appropriate underwater communication techniques. A decompression chamber would be within close helicopter flight proximity to the operations. After exercises involving underwater detonations, the area would be searched for injured animals.

All U.S. and coalition Naval Salvage Force exercise scenarios will be conducted in accordance with the following references:

- a. U.S. Navy Diving Manual Revision 4, with a change a dated March 2001
- b. U.S. Navy Salvage Safety Manual
- c. U.S. Navy Salvage Manual Vol 1—Strandings
- d. U.S. Navy Salvage Manual Vol 2—Harbor Clearance
- e. U.S. Navy Salvage Manual Vol 3—Firefighting and Damage Control
- f. U.S. Navy Salvage Manual Vol 5—Petroleum Oil and Lubricant Offload
- g. U.S. Navy Towing Manual
- h. OPNAVINST 5100.19B (safety manual)
- i. Fleet Exercise Publication—4 Chapter 12 Mobile Diving and Salvage Units and Chapter X ARSs

2.2.20 AMPHIBIOUS EXERCISE (AMPHIBEX)

Purpose—To provide a realistic environment for amphibious assault training, reconnaissance training, hydrographic surveying, surf condition observance, and communication.

Description—An ATF is normally a mix of three to five amphibious ships equipped with aircraft landing platforms for helicopter and fixed wing operations and well decks for carrying landing craft and assault amphibian vehicles (AAVs). The ATF typically launches its aircraft, and landing craft up to 40 kilometers (25 miles) from a training beachhead. AAVs are typically launched approximately 1,829 meters (2,000 yards) from the beach. The aircraft provide support while the landing craft approach and move onto the beach. The troops disperse from the landing craft and would utilize existing vegetation for cover and concealment while attacking enemy positions. Naval Surface Fire Support and CASEX are integrated into an amphibious assault. There will be simulated gunnery as part of the PMRF AMPHIBEX, using small arms with blanks. The landing craft and troops proceed to a designated area where they stay 1 to 4 days. The backload operation takes place when actions on the objective are completed. The backload will normally be accomplished over a 2- to 3-day period.

Assets—AMPHIBEX involves the use of rubber boats, amphibious vehicles, landing craft, helicopters, and attack aircraft. Types of amphibious landing craft and vehicles include:

- LCAC, an air-cushioned vessel equipped with an open-bay craft with roll-on, roll-off ramps capable of carrying tank-sized vehicles or up to 185 troops. Approximately 27 meters (88 feet) by 14 meters (47 feet).

- LCU, a displacement hull craft designed to land very heavy vehicles, equipment, and cargo or up to 400 troops on the beach. Approximately 41 meters (135 feet) by 9 meters (29 feet).
- AAV, a tracked, armored personnel carrier with a capacity of 21 troops. Approximately 7 meters (24 feet) by 4 meters (13 feet).
- CRRC, a lightweight, inflatable boat carrying up to 8 people used for raid and reconnaissance missions. Approximately 5 meters (16 feet) by 2 meters (6 feet).
- RHIB, similar to the CRRC, but larger, carrying up to 15 people. Approximately 7 meters (24 feet) by 3 meters (9 feet).

(EWTGLANT On-Line Resource Center, 1998)

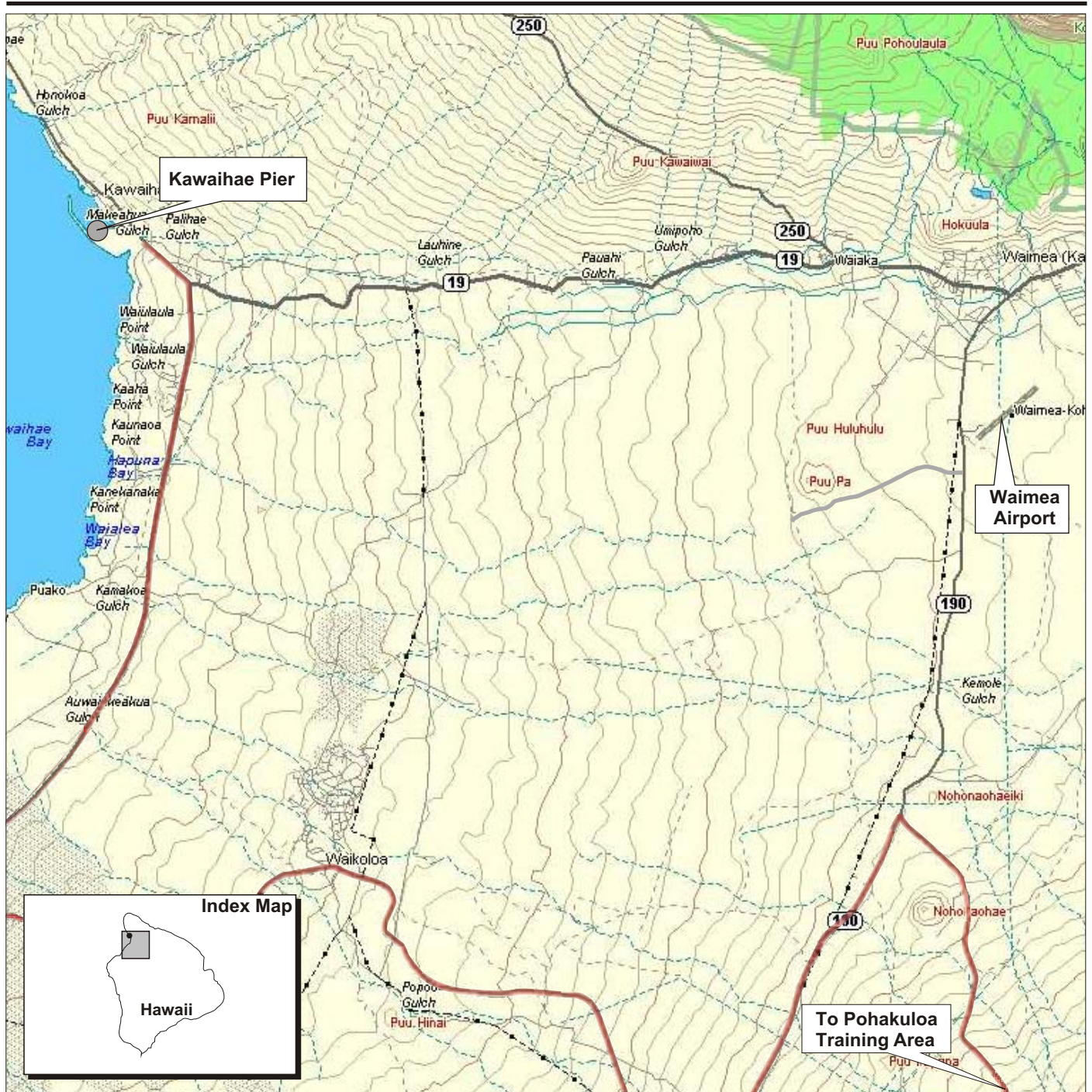
Location—The primary location for the amphibious landings is Majors Bay, PMRF, Kauai (figure 2-3). Amphibious landings could also occur at the K-Pier boat ramp, Kawaihae, Hawaii (figure 2-12), Marine Corps Base Hawaii (three beaches) (figure 2-4), Marine Corps Training Area Bellows portion of Bellows Air Force Station, Oahu (figure 2-4), and at the K-Pier boat ramp, Kawaihae, Hawaii.

Duration—The AMPHIBEX typically occurs over a 2- to 3-day period, with three separate exercises per RIMPAC. Future AMPHIBEX could range from a 2 to 14 days, with one to four separate exercises.

Standard Procedures—Amphibious landings are restricted to specific areas of designated beaches. The AMPHIBEX would be conducted in compliance with EO 13089, *Coral Reef Protection*. Before each major amphibious landing exercise is conducted, a hydrographic survey will be performed to map out the precise transit routes through sandy bottom areas. Within 1 hour of initiation of the AMPHIBEX landing activities, the landing routes and beach areas would be determined to be clear of marine mammals and sea turtles. If any are seen, the exercise would be delayed until the animals leave the area. During the landing the crews follow established procedures, such as having a designated lookout watching for other vessels, obstructions to navigation, marine mammals (whales or monk seals), or sea turtles. Other measures include publication of training overlays that identify the landing routes and any restricted areas. Sensitive cultural resource areas are identified and bounded by a keep-out buffer.

Where necessary, pre-exercise surveys for turtles are conducted so their feeding and nesting areas would be avoided.

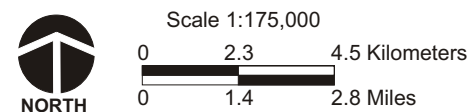
Vehicles are restricted to existing roads, trails, and other disturbed areas and would not traverse undisturbed, off-road areas where they might harm vegetation or stimulate erosion. (U.S. Pacific Command, 1995a)



EXPLANATION

- RIMPAC Exercise Area
- Route To Pohakuloa Training Area

Kawaihae (K-Pier) and Access to Pohakuloa Training Area



Hawaii, Hawaii

Figure 2-12

2.2.21 SUBMARINE OPERATIONS (SUBOPS)

Purpose—SUBOPS involve training in using active and passive sonar systems to find surface ships and submarines, responding to simulated attacks using evasive maneuvering and countermeasures in deep and shallow waters, and avoiding detection by submarine warfare weapon systems.

Description—Exercises include underway operations, Submarine Warfare Exercises (submarine versus submarine and submarine versus ship tracking), Range exercises (torpedo firing exercises), and a Torpedo Training and Certification program conducted at the PMRF ranges.

Assets—One or more submarines; torpedo, submarine, and surface ship targets; torpedo recovery helicopter; and a weapons recovery boat could be utilized.

Location—SUBOPS will occur throughout much of the Hawaii Operating Area (figure 2-13). Weapon firing would mainly occur in the PMRF Shallow Water Training Range (figure 2-3), BARSTUR and BSURE Ranges (figure 2-8), and the training areas within the 100-fathom isobath contour between the islands of Maui, Lanai, and Molokai, including Penguin Bank.

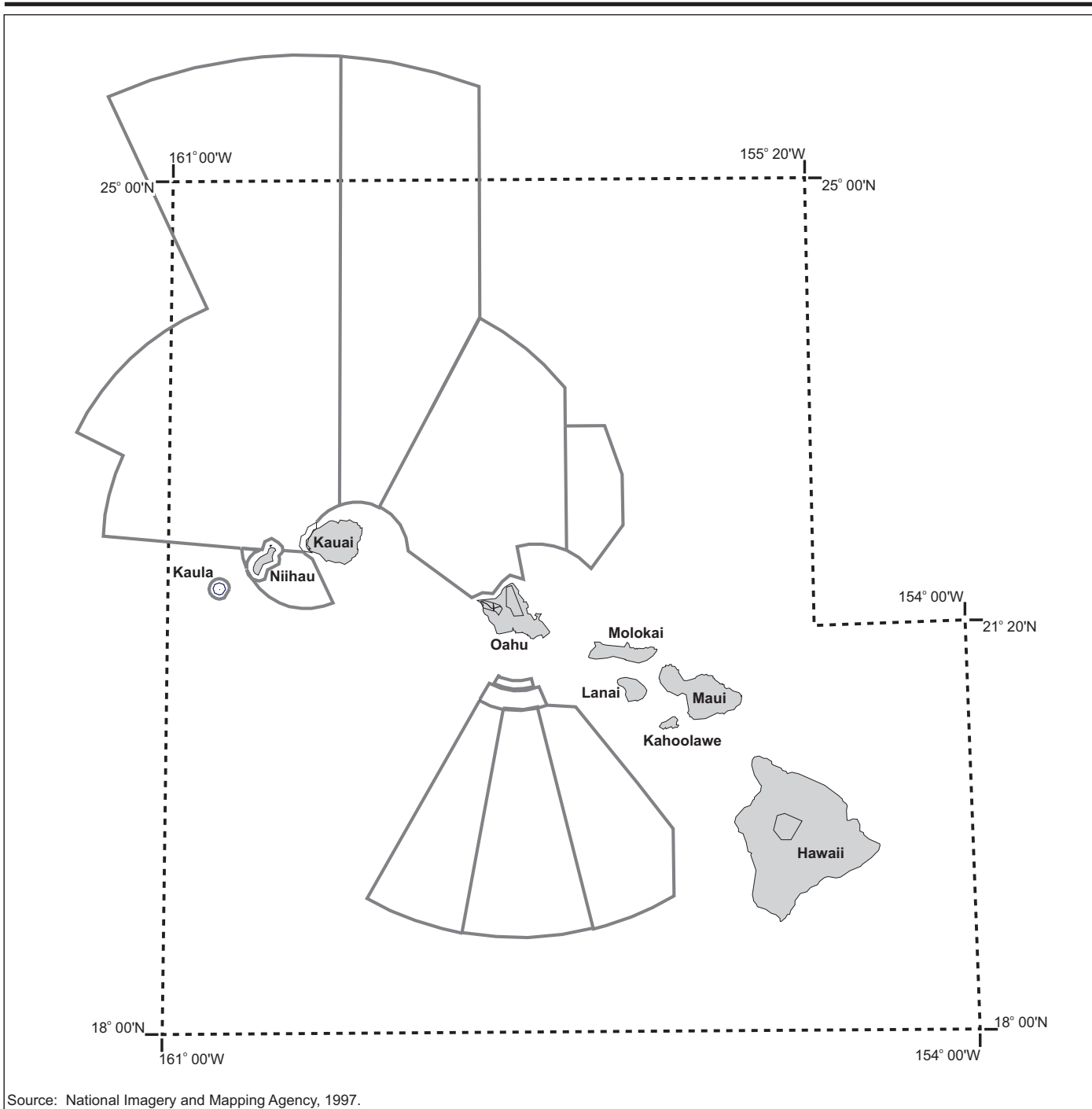
Duration—Submarine operations occur continuously throughout RIMPAC. Individual exercises typically last several hours to 5 days. Future individual exercises could last from 1 to 7 days.

Standard Procedures—Submarine activity would be coordinated with all surface and aircraft activity in accordance with FACSFACPH Instruction 3120.3A (1998) to ensure the safety of the submarine crew. Most submarine activities would occur between approximately 27 meters (90 feet) below the water surface and the ocean floor.

2.2.22 OTHER ACTIVITIES

Transmitter Sites—Various mobile electronic transmitters are temporarily established on Niihau, Kauai, Molokai, Oahu, and Hawaii (figure 2-1). The transmitter sites include vehicles and portable equipment to generate low-power electronic signals that simulate various types of radar. Site setup and operation generally occur at locations previously used for such activities.

Boarding Exercises—As part of various training scenarios, insurgent resupply routes are established throughout the Hawaiian Islands. Boarding exercises occur between patrol craft, supply ships and torpedo retrieval boats (figure 2-14). The multiple types of exercises are designed to provide training on how to board and how to be boarded.



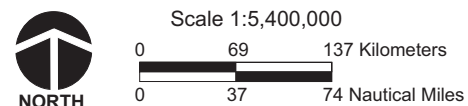
EXPLANATION

- Land Area
- Water Area
- Warning Area
- Restricted Airspace
- Submarine Operations Area

Submarine Operations Area

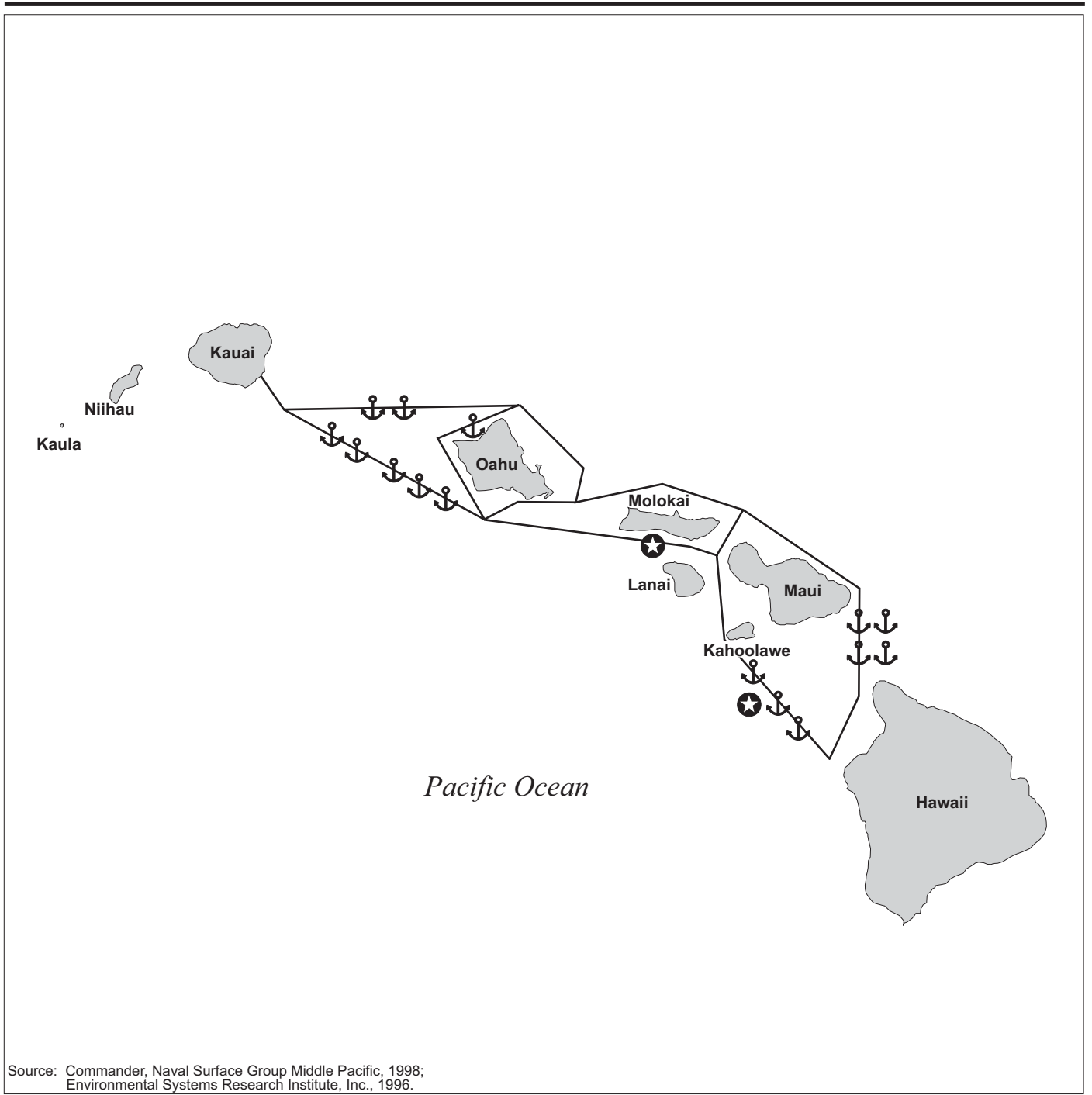
Hawaiian Islands

Figure 2-13








05-24-02 Sub Op Area

RIMPAC Programmatic EA



EXPLANATION

-  Land Area
-  Water Area
-  Insurgent Re-supply Routes
-  Boarding
-  Disable/Capture/Tow



Scale 1:3,500,000

0 45 89 Kilometers

0 24 48 Nautical Miles

Boarding Exercise

Hawaiian Islands

Figure 2-14

2.3 PROPOSED ACTION

The exercises planned for RIMPAC as defined by the individual RIMPAC exercise OPORDER become the Proposed Action (table 2-4). The Proposed Action is a range of exercise durations as stated under each exercise. Future RIMPAC exercises would involve elements ranging from 20 to 60 ships, 1 to 10 submarines, 24 to 260 aircraft, and 8,000 to 30,000 military personnel.

Three RIMPAC planning conferences would lead to the development of the RIMPAC exercise OPORDER, and briefings would be used to raise the overall awareness of environmental issues to be considered when planning the RIMPAC exercises. Particular attention would be given to operational constraints defined by various Standard Operating Policies and Procedures, existing environmental laws and regulations, and site-specific Land Use Plans and Environmental Management Plans.

2.4 NO-ACTION ALTERNATIVE

Under the No-action Alternative, the RIMPAC exercise would not be conducted. The existing exercises would not be combined into a multinational, sea control/power projection fleet training exercise in a multi-threat environment. Multinational force command, control, and communication training for operating in simulated hostile scenarios would not occur. There would be no enhanced communication and cooperation between nations, and the United States would not be able to ensure that it can accomplish shared operational objectives with other Pacific Rim nations. Operational forces would not be able to engage in multinational battle-realistic training.

Individual exercises would continue to be routinely conducted by U.S. forces in the open-ocean, nearshore, and onshore environments in established and recognized training areas.

2.5 ALTERNATIVES CONSIDERED BUT NOT CARRIED FORWARD


All relevant military installations in the Hawaiian area were reviewed for inclusion in RIMPAC. No specific installations were determined not to be relevant at some time during future RIMPACs. A list of non-participating Installations has not been included. If additional locations are selected, appropriate documentation will be performed.

Table 2-4: Proposed Action Locations and Exercises

Service	Location	Island	IN-PORT/ SUPPORTEX	C2	AIROPS	SAMEX	AAMEX	ASMEX	SSMEX	ASWEX	MINEX	SMWEX	STWEX, CASEX	GUNNEX	SINKEX	LFX	HAO/NEO	HA/DR	SPECWAROPS	DEMO	SALVAGE OPS	AMPHIBEX	SUBOPS
U.S. Navy	Pacific Missile Range Facility *	Kauai		02	02	02	02		02			02	02						02 *			02	
	Niihau	Niihau																					
	Kaula	Kaula																					
	Pearl Harbor **	Oahu	02	02	02																02		
	Iroquois Land/Underwater Range																						
	Pu'uloa Underwater Range – Pearl Harbor	Oahu																		02	02		
	Barbers Point Underwater Range	Oahu																					
	Coast Guard Air Station Barbers Point/ Kalaheo Airport	Oahu																					
	PMRF Warning Areas	Ocean Areas				02	02	02	02	02	02			02	02								02
	Oahu Warning Areas	Ocean Areas								02				02									02
	Open Ocean Areas	Ocean Areas								02													02
	U.S. Command Ship	Ocean Areas																					
U.S. Marines	Marine Corps Base Hawaii	Oahu		02	02																	02	
U.S. Air Force	Hickam Air Force Base	Oahu			02																		
	Marine Corps Training Area/Bellows Air Force Station	Oahu																				02	
U.S. Army	Kahuku Training Area	Oahu																					
	Makua Military Reservation	Oahu																					
	Dillingham Military Reservation	Oahu																					
	Wheeler Army Airfield	Oahu																					
	K-Pier, Kawaihae	Hawaii																				02	
	Bradshaw Army Airfield	Hawaii			02																		
	Pohakuloa Training Area	Hawaii		02									02										
State	Keehi Lagoon	Oahu																			02		

* Includes Port Allen and Makaha Ridge

** Includes Ford Island and all other areas within the harbor.

 Proposed exercise locations

 Proposed RIMPAC 02 exercise locations

Exercise Types:

AAMEX = Air-to-Air Missile Exercise
 AIROPS = Aircraft Operations
 AMPHIBEX = Amphibious Landing Exercise

ASMEX = Air-to-Surface Missile Exercise
 ASWEX = Anti-submarine Warfare Exercise
 CASEX = Close Air Support
 C2 = Command and Control
 DEMO = Demolition Exercise

GUNNEX = Gunnery Exercise
 HA/DR = Humanitarian Assistance/Disaster Relief
 HAO/NEO = Humanitarian Assistance Operation/
 Non-combatant Evacuation Operation
 IN-PORT = In-port Briefings and Activities
 LFX = Live Fire Exercise
 MINEX = Aerial Mining Exercise
 SALVAGE OPS = Salvage Operations
 SAMEX = Surface-to-Air Missile Exercise

SINKEX = Sinking Exercise
 SMWEX = Ship Mine Warfare Exercise
 SPECWAROPS = Special Warfare Operations
 SSMEX = Surface-to-Surface Missile Exercise
 STWEX = Strike Warfare Exercise
 SUBOPS = Submarine Operations
 SUPPORTEX = In-port Support Exercise

3.0

AFFECTED ENVIRONMENT

3.0 AFFECTED ENVIRONMENT

This section describes existing conditions and the environment at each location that may be affected by the Proposed Action and the No-action Alternative. Information is provided to serve as a baseline from which to identify and evaluate changes that may result from proposed activities. Sources of data in this section include existing reference materials such as EAs, EISs, installation master plans, personal contacts, and published sources.

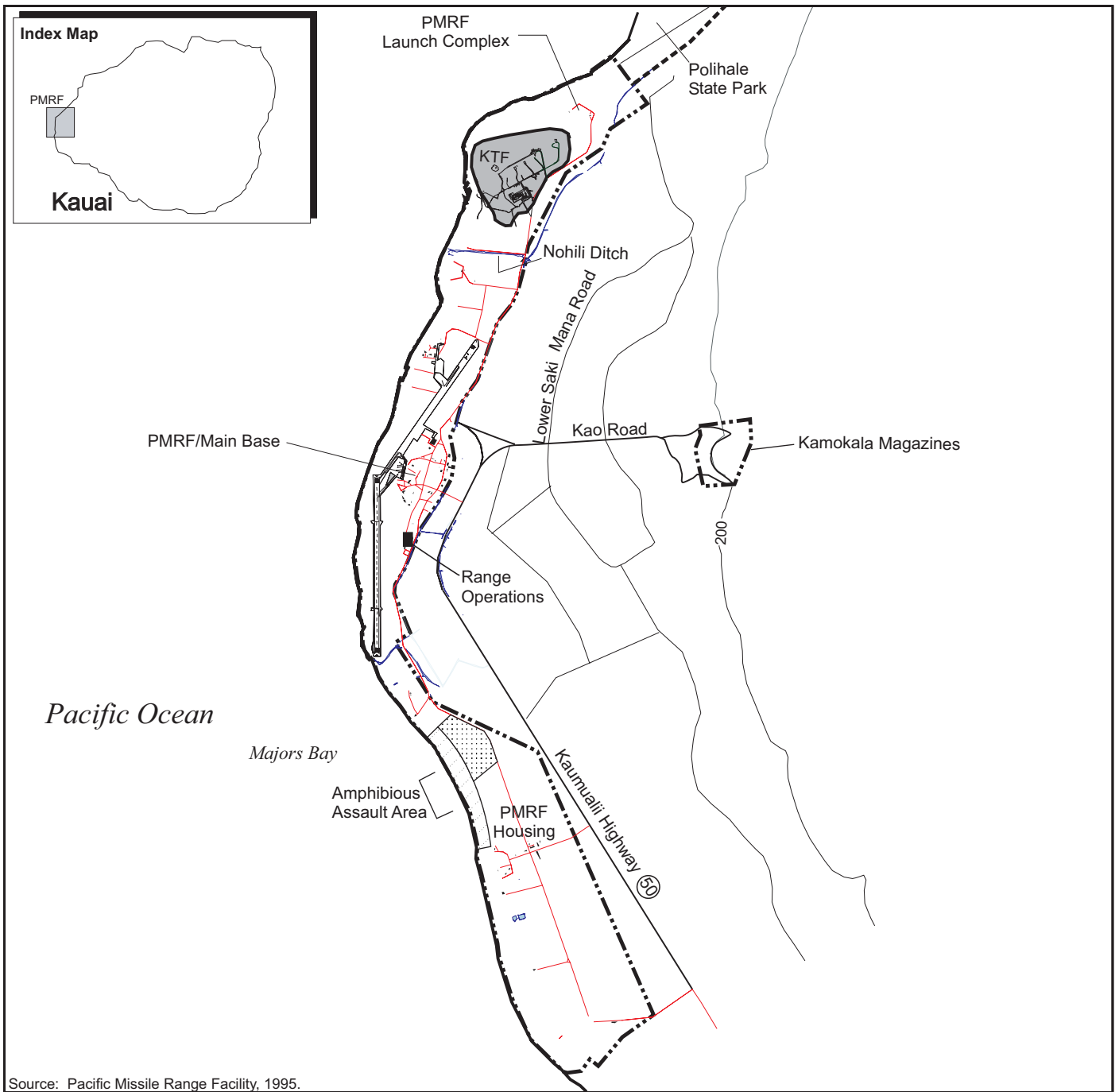
The affected environment is discussed in terms of 11 potential resource areas: air quality, airspace, biological resources, cultural resources, geology and soils, hazardous materials and waste, land use, noise, safety and health, socioeconomics, and water resources. Each resource area is discussed at each location unless the proposed activities at that location, based on past experiences, would not foreseeably result in an impact. Table 3-1 provides a summary of resource areas addressed at each location in this document. The data presented are commensurate with the importance of the potential impacts in order to provide the proper context for evaluating impacts.

Aircraft operations that support RIMPAC could occur at PMRF, Ford Island–Pearl Harbor, Coast Guard Air Station Barbers Point/Kalaeloa Airport, Marine Corps Base Hawaii, Hickam Air Force Base, Wheeler Army Airfield, and Bradshaw Army Airfield. These activities are a part of the ongoing exercise ground support operations at these locations. No impacts from AIOPS have been identified due to specific RIMPAC activities, and the small increase in the number of aircraft operations at these locations would be within operational guidelines. Therefore, aircraft ground support operations have not been addressed in this document.

3.1 PACIFIC MISSILE RANGE FACILITY, KAUAI

Amphibious landings at PMRF occur at Majors Bay landing beach, located south of the Main Base and about 300 meters (1,000 feet) north of the PMRF housing area. The landing beach is used for large-scale amphibious training by ATF and Marine Expeditionary Unit elements. Once ashore, there is no adjacent maneuver area, which limits training value. Figure 3-1 shows the location of the landing area at Majors Bay in relationship to other facilities on base.

Port Allen is a small harbor and fully developed industrial seaport located on the south central coast of Kauai, approximately 24 kilometers (15 miles) southeast of PMRF (figure 2-1). Port Allen will serve as a materiel receiving and staging area for SPECWAROPS activities at PMRF. Two warehouses at Port Allen are presently leased by the U.S. Navy.



EXPLANATION

- Existing Facilities/Landmarks
- Boundary of PMRF
- Boundary of Polihale State Park
- RIMPAC Staging Area

Note: All locations are approximate.

- Kauai Test Facility
- Contour Lines (ft)
- RIMPAC Training Beach

PMRF = Pacific Missile Range Facility
KTF = Kauai Test Facility

Pacific Missile Range Facility

Kauai, Hawaii

Figure 3-1



Scale

0 792 1,585 Meters

0 2,600 5,200 Feet

05-24-02 PMRF

RIMPAC Programmatic EA

Table 3–1: RIMPAC Resource Area Summary

Affected Environment	Resource Area										
	Air Quality	Airspace	Biological Resources	Cultural Resources	Geology & Soils	Hazardous Materials and Waste	Land Use	Noise	Safety and Health	Socioeconomics	Water Resources
PMRF Kauai (Port Allen, Makaha Ridge)	x	x	x	x	x	x	x	x	x		x
Niihau			x	x							
Kaula		x	x	x					x		x
Pearl Harbor Oahu (Ford Island and other areas within the harbor),		x	x							x	
Iroquois Land/Underwater Range, Oahu			x								
Pu'uloa Underwater Range, Oahu			x				x		x		
Barbers Point Underwater Range, Oahu			x				x		x		
Coast Guard Air Station Barbers Point/ Kalaeloa Airport, Oahu		x	x								
Marine Corps Base Hawaii, Oahu		x	x	x				x			
Hickam Air Force Base, Oahu		x	x	x							
Marine Corps Training Area Bellows/ Bellows Air Force Station, Oahu		x	x	x			x	x			
Kahuku Training Area, Oahu		x	x	x							
Makua Military Reservation, Oahu		x	x	x				x	x		
Dillingham Military Reservation, Oahu		x	x	x							
Wheeler Army Airfield, Oahu			x								
K-Pier, Kawaihae, Hawaii			x				x				
Bradshaw Army Airfield, Hawaii		x	x	x							
Pohakuloa Training Area, Hawaii		x	x	x				x	x		x
Ocean Areas		x	x						x		x
Keehi Lagoon, Oahu			x							x	

3.1.1 AIR QUALITY—PACIFIC MISSILE RANGE FACILITY, KAUAI

The State of Hawaii is in attainment of the National Ambient Air Quality Standards established for carbon monoxide, nitrogen dioxide, sulfur dioxide, particulate matter, ozone, and lead (40 CFR 81.312 and 52.631(b)). Compliance with these standards can be attributed, in part, to the persistent and strong trade winds that act to effectively disperse air pollutants. (U.S. Pacific Command, 1995b)

The main air pollution sources at PMRF are diesel-fuel powered generators, aircraft, and rocket launches. PMRF has a Title V Air Permit. This permit covers all stationary emissions sources on PMRF. Aircraft emissions and missile exhaust emissions are both

considered mobile sources and are thus exempt from permitting requirements. (Pacific Missile Range Facility, Barking Sands, 1998)

3.1.2 AIRSPACE—PACIFIC MISSILE RANGE FACILITY, KAUAI

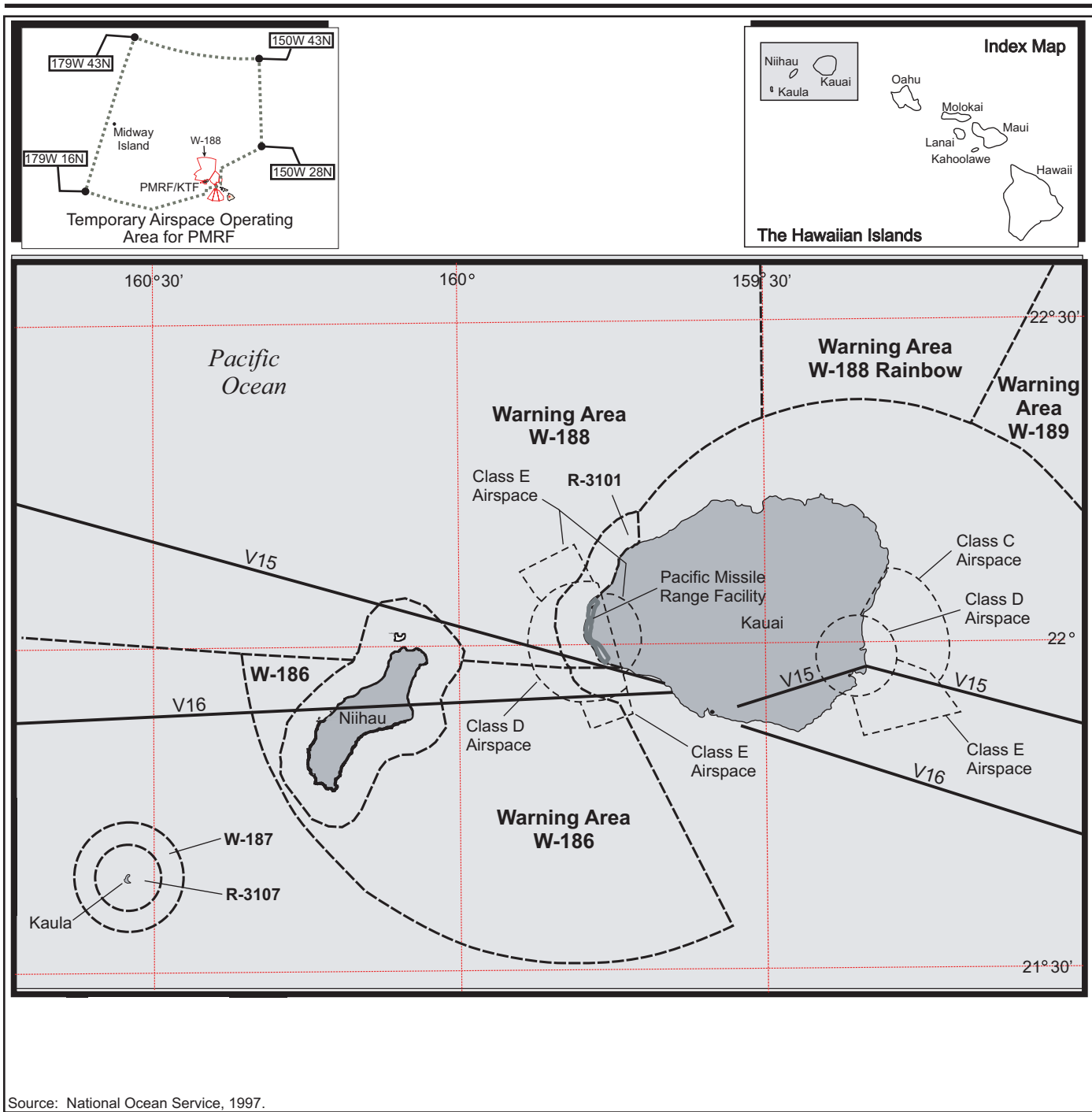
The special use airspace in the PMRF region of influence (figure 3-2) consists of Restricted Airspace R-3101, which lies immediately above PMRF and to the west of Kauai, portions of Warning Area W-188 north of Kauai, and Warning Area W-186 southwest of Kauai, all controlled by PMRF.

The airfield at PMRF serves as a heliport and a training facility for fixed wing landings and takeoffs. The overall number of air operations at PMRF was 12,335 in fiscal year 1995. PMRF is located in Class D controlled airspace (762-meter [2,500-foot] ceiling) that is used for airspace surrounding airports that have an operational control tower. It is surrounded to the north, south, and east by Class E airspace with a floor 213 meters (700 feet) above the surface (figure 3-2). The adjacent airspace outside 6 kilometers (4 miles) is international airspace designated for Special Use as Warning Area W-188. It is controlled by Honolulu Combined Center Radar Approach Control on behalf of PMRF for a variety of weapons testing exercises, including missile launches. Under agreement with the FAA, the PMRF Range Safety Officer is solely authorized and responsible for administering range safety criteria, the surveillance and clearance of the range, and the issuance of firing orders. (Pacific Missile Range Facility, Barking Sands, 1998)

Although relatively remote from the majority of jet routes that crisscross the Pacific (figure 3-3), the airspace in the PMRF area includes two Instrument Flight Rules en route low altitude airways used by commercial air traffic. The most pertinent one to PMRF is V15, which passes east to west through the southernmost part of Warning Area W-188 (figure 3-2). An accounting of the number of flights using this airway is not maintained. There is a high volume of sightseeing helicopter traffic in the region, although none of them fly over PMRF and its Restricted Airspace. (Pacific Missile Range Facility, Barking Sands, 1998)

3.1.3 BIOLOGICAL RESOURCES—PACIFIC MISSILE RANGE FACILITY, KAUAI

The vegetation on PMRF is composed of two principal habitat types: ruderal vegetation and kiawe/koa haole scrub. On areas of PMRF used for launch operations, ruderal vegetation is mowed regularly. The vegetation adjacent to PMRF in the ground hazard area is dominated by sugar cane, ruderal vegetation, and wetlands associated with agricultural ponds and drains. Within the PMRF northern launch area, ruderal vegetation is present where the natural vegetation has been disturbed. Lesser habitat types of coastal dune vegetation cover much of the major dunes north of KTF. KTF is in the southern portion of the northern PMRF launch area, and a well-developed native strand community exists along the shoreline. (Pacific Missile Range Facility, Barking Sands, 1998)



EXPLANATION

- En Route Low Altitude Airways
- Land Area
- Water Area



Airspace Use Surrounding Pacific Missile Range Facility

Kauai, Hawaii

Figure 3-2

The broad, white, sandy beach fronting Majors Bay supports only sparse littoral vegetation composed of kiawe-koa haole thickets on the northern half and native *Dodonaea-Vitex* scrub on the southern half. Migratory shorebirds and seabirds that frequent the beach are among 39 bird species that have been observed throughout PMRF. No threatened or endangered terrestrial species have been recorded within the amphibious landing site. (U.S. Army Garrison, Hawaii, and U.S. Army Corps of Engineers, 1997a)

Two federally listed plant species have been observed north of PMRF (appendix B, table B-1). Ohai (*Sesbania tomentosa*) has been observed in the sand dunes to the north of PMRF in Polihale State Park. Also not in PMRF, but observed in Polihale State Park is Lau'ehu (*Panicum niihauense*), a rare grass, that is a federally endangered species and has been observed near Queens Pond. (U.S. Department of the Navy, 2001a) Critical habitat for Lau'ehu has been proposed at PMRF by the U.S. Fish and Wildlife Service (USFWS), but no final determination has been made at this time. Again, the Lau'ehu does not currently exist at PMRF.

Threatened green sea turtles (*Chelonia mydas*) are known to infrequently nest on the beach at PMRF. During a 1990 survey of the shoreline of PMRF, approximately 32 green sea turtles, a federal threatened and state endangered species, were observed. One turtle nest was discovered on the southern portion of PMRF in 1985 (Pacific Missile Range Facility, Barking Sands, 1998). In 1999, two nests and four indications of further nesting activities were observed in the Nohili ditch area.

The endangered Hawaiian monk seal (*Monachus schauinslandi*) occasionally inhabits the waters fronting the beach landing area. Monk seals have been observed to haul out on PMRF beaches and have pupped on nearby beaches as recently as 1999. The first Hawaiian monk seal birth on a Kauai beach since 1993 occurred on PMRF in 1999 (Pacific Missile Range Facility, 1999). Only four other Hawaiian monk seal births have been recorded on Kauai since 1961 (Navy Environmental News, 1999). The fact that humans frequent all beaches on PMRF may generally discourage use by monk seals. Humpback whales (*Megaptera novaeangliae*) have been reported to enter waters less than 183 meters (100 fathoms, or 600 feet); however, this occurrence is atypical. In general, coral cover is relatively low, comprising six common species that cover from 1 to 8 percent of hard bottom areas. Other benthic species include green and black sponges and benthic algae. (U.S. Army Garrison, Hawaii, and U.S. Army Corps of Engineers, 1997a) Essential Fish Habitat (EFH) areas or Habitat Areas of Particular Concern (HAPC) have been identified in the waters off of PMRF in areas greater than 40 meters (120 feet) in depth.

The Laysan albatross (*Diomedea immutabilis*), a seasonal, migratory bird protected under the Migratory Bird Treaty Act, uses ruderal vegetation areas for courtship and nesting. Six pairs of Laysan albatross were observed in the KTF area, which is a favored location, during a field survey for the Strategic Target System program in 1990. The Laysan albatross is being discouraged from nesting throughout PMRF and specially to prevent interaction between the species and aircraft using the runway. Local populations of the species are being encouraged to use the Kilauea Lighthouse area on the northeastern shore

of the island of Kauai. This action is being accomplished under a USFWS permit. (Pacific Missile Range Facility, Barking Sands, 1998)

Six species of birds listed as federally threatened or endangered are potentially present or confirmed at PMRF (appendix B, table B-1). Kauai provides the last Hawaiian habitat for the federally threatened Newell's shearwater (*Puffinus auricularis newelli*). (Pacific Missile Range Facility, Barking Sands, 1998)

The dark-rumped petrel (*Pterodrome phaeopygia sandwicense*), which is listed as federally endangered, may traverse the area from their nesting grounds to the sea (Pacific Missile Range Facility, Barking Sands, 1998).

The Hawaiian (American) coot (*Fulica americana alai*), Hawaiian black-necked stilt (*Himantopus mexicanus knudseni*), Hawaiian common moorhen (*Gallinula chloropus sandwicensis*), and Hawaiian duck (*Anas wyvilliana*) are federal and state endangered species that have been observed in the drainage ditches and ponds at PMRF. (Pacific Missile Range Facility, Barking Sands, 1998)

Pueo (*Asio flammeus sandwichensis*) (Hawaiian short-eared owl) is a state-listed endangered species. This short-eared owl is the only endemic terrestrial bird species that occurs in the region. (Pacific Missile Range Facility, Barking Sands, 1998)

The native federal endangered Hawaiian hoary bat (*Lasiurus cinereus* spp. *semotus*) has not been observed at PMRF, although it is known to feed offshore and has been observed at the Polihale State Park north of PMRF (Pacific Missile Range Facility, Barking Sands, 1998).

The federal threatened Newell's shearwater was not observed at Makaha Ridge, but may fly over the site while foraging. In addition, the federal and state endangered Hawaiian goose, or *ne ne*, occurs as a breeding population within the Makaha Ridge Facility.

The Magnuson-Stevens Fishery Conservation and Management Act, as amended by Public Law 94-265, requires that federal agencies consult with the National Marine Fisheries Service on activities that could harm EFH areas. EFH refers to "those waters and substrate (sediment, hard bottom) necessary to fish for spawning, breeding, feeding or growth to maturity." EFH occurs and is incorporated within Kauai's Exclusive Economic Zone, the 322-kilometer (200-mile) limit around the island.

EFH areas and HAPC for adult and juvenile bottomfish include the water column and all bottom habitat extending from a depth of 40 meters (22 fathoms, or 132 feet) to a depth of 280 meters (153 fathoms, or 918 feet), which encompasses important steep drop-offs and high relief habitats (Western Pacific Fishery Management Council, 2002). Shallow-water (0 to 100 meters [0 to 328 feet]) bottomfish species include uku, thicklip trevallies, groupers, emperors, amberjack, and taape. Deep-water (100 to 400 meters [328 to 1,312 feet]) species include ehu, onaga, opapaka, gindai, hapupuu, and lehi. (Western Pacific Fishery Management Council, 1998)

Pelagic HAPC are designated as the water column down to 1,000 meters (3,280 feet) from the shoreline to the Exclusive Economic Zone that lies above all seamounts and banks shallower than 2,000 meters (1,000 fathoms, or 6,000 feet). Marketable pelagic species include striped marlin, bluefin tuna, swordfish, albacore, mackerel, skipjack, sailfish, kawakawa, and various sharks. (Western Pacific Fishery Management Council, 1998)

Banks with summits less than 30 meters (98 feet) have been designated as HAPC for crustaceans. Crustacean species include spiny lobster, slipper lobsters, and Kona crabs. (Western Pacific Fishery Management Council, 1998)

3.1.4 CULTURAL RESOURCES—PACIFIC MISSILE RANGE FACILITY, KAUAI

The U.S. Navy completed a Cultural Resources Management Overview Survey of PMRF for the purpose of establishing an inventory of cultural resource properties (U.S. Department of the Navy, 1996). Since the preparation of the Cultural Resources Management Overview Survey, the U.S. Navy has conducted a Phase I archaeological survey of the installation's unsurveyed areas, and a historic resources survey that includes Cold War properties.

PMRF has a Cultural Resources Management Plan (Pacific Missile Range Facility, Barking Sands, 1998) that includes provisions for a coordination process among the installation, regulatory agencies, and the public that help ensure proper management of the installation's cultural resources (DoD Instruction 4715.3, *Environmental Conservation Program*). The U.S. Navy is in the process of establishing a programmatic agreement with the State Historic Preservation Officer (SHPO) to address long-term PMRF activities. An Integrated Cultural Resources Management Plan will be produced over the next year.

The Majors Bay landing site has no recorded cultural resources in the landing or staging areas. The beach area has low potential for discovery of cultural resources and human remains. (U.S. Army Garrison, Hawaii, and U.S. Army Corps of Engineers, 1997a) There is one documented cultural site in the over-night area inland of the beach. This site is fully marked in the field and should be easily recognized as a "keep-out" area.

A cursory inspection for cultural resources within the Makaha Ridge area conducted for the PMRF EIS determined that it is a "built environment" and that all the existing level areas within this property have been graded, improved, paved, or otherwise developed. No cultural resources are noted for the Makaha Ridge area in the Cultural Resources Management Overview Survey for PMRF. Existing buildings and structures within Makaha Ridge related to defense operations carried out during the Cold War could be considered potentially significant if they possess unique engineering features.

3.1.5 GEOLOGY AND SOILS—PACIFIC MISSILE RANGE FACILITY, KAUAI

The island of Kauai is the result of a massive shield volcano, part of the chain of similar volcanoes that migrated northwest to southeast to form the Hawaiian archipelago. Kauai is the oldest of the eight main islands. Volcanic rocks exposed in the western half of the island are composed of Pliocene basaltic flows. The volcanic terrain forms an abrupt,

crescent-shaped scarp at the eastern boundary of the Mana Plain, the result of wave action from a higher sea stand. PMRF is situated on the coastal fringe of the Mana Plain.

Coral reefs developed upon the eroded platform around the island when the sea was about 1.5 meters (5 feet) above its current level. Wave action has eroded the coral surface, and together with other sources, creates a source for beach sand at Majors Bay, which is actively being deposited and reworked along the shoreline. Beach sand is generally medium to coarse grained.

Along the ocean margin of PMRF are areas of active dunes and beaches. Dune lands consist of hills and ridges of sand drifted and piled by wind. The largest of these is Nohili Dune, north of KTF, in the northern portion of PMRF. The hills and ridges are actively shifting, or so recently stabilized that no soil horizons have developed. The sand is chiefly calcareous, derived from coral and seashells.

Soil samples at the PMRF Vandal launch site were studied to determine if lead concentrations resulting from rocket emissions exceeded the 400 milligrams per kilogram (400 parts per million) preliminary residential site cleanup goal established by EPA Region 9 or the 750 milligrams per kilogram (75 parts per million) established by the State of Hawaii Department of Health for industrial sites. No site soil samples had lead concentrations exceeding 400 milligrams per kilogram prior to the 1994 Vandal launches. After five 1994 launches, two sites contained lead concentrations exceeding 400 milligrams per kilogram. Both of these sites were located within 15 meters (50 feet) of the launch site. Concentrations of lead 30.5 meters (100 feet) away in the same direction were only 30 and 75 milligrams per kilogram (30 and 75 parts per million). None of the lead concentrations outside this 30.5-meter (100-foot) range were above the reporting limit. (Pacific Missile Range Facility, Barking Sands, 1998)

The U.S. Department of Energy (DOE) also tested for lead at KTF and found levels up to 270 milligrams per kilogram (270 parts per million) and indicated that these were not "actionable levels" (U.S. Army Strategic Defense Command, 1992). The DOE report described studies of lead poisoning in children, which found that levels of lead 300 to 400 milligrams per kilogram (300 to 400 parts per million) were acceptable. An additional study of the soils of the Mana Plain and KTF area revealed that chloride and pH do not indicate residual effects from past missile launches at KTF. (Pacific Missile Range Facility, Barking Sands, 1998)

3.1.6 HAZARDOUS MATERIALS AND WASTE—PACIFIC MISSILE RANGE FACILITY, KAUAI

PMRF manages hazardous materials through the U.S. Navy's Consolidated Hazardous Materials Reutilization and Inventory Management Program (CHRIMP). CHRIMP mandates procedures to control, track, and reduce the variety and quantities of hazardous materials in use at facilities. The CHRIMP concept established Hazardous Materials Minimization Centers as the inventory controllers for U.S. Navy facilities. (Pacific Missile Range Facility, Barking Sands, 1998)

PMRF has management plans for oil and hazardous materials outlined in the *PMRF Spill Prevention Control and Countermeasures Plan* and the *Installation Spill Contingency Plan (2001)*, both of which also regulate tenant organizations and PMRF associated sites (U.S. Army Strategic Defense Command, 1992).

PMRF has developed programs to comply with the requirements of the Superfund Amendments and Reauthorization Act Title III, commonly known as the Emergency Planning and Community Right-to-Know Act. This effort has included submission to the state and local emergency planning committees of annual Tier II forms, which are an updated inventory of chemicals or extremely hazardous substances in excess of threshold limits. These chemicals at PMRF include jet fuel, diesel fuel, propane, gasoline, aqueous fire fighting foam, chlorine, used oil, and paint. (Pacific Missile Range Facility, Barking Sands, 1998)

PMRF is a large-quantity generator and holds an EPA identification number. In 1999, PMRF generated 4,963 kilograms (10,942 pounds) of hazardous waste (Anderson, 2000). The majority of wastes are collected and containerized at PMRF for offsite disposal through the Defense Reutilization and Marketing Office at Pearl Harbor within 90 days (U.S. Army Strategic Defense Command, 1992). PMRF has a pollution prevention plan that was updated in February 1996 (Pacific Missile Range Facility, Barking Sands, 1998).

3.1.7 LAND USE—PACIFIC MISSILE RANGE FACILITY, KAUAI

PMRF's land use management program is established in the *Master Plan, PACMISRANFAC HAWAREA, Barking Sands, Kauai, Hawaii* (U.S. Department of the Navy, 1990). The dominant land use on PMRF, in terms of area, is the explosive safety and airfield clear zones, which cover 39 percent of the base (Pacific Missile Range Facility, Barking Sands, 1998).

The Majors Bay landing area lies along the beach between the Officers' Beach Facility and the U.S. Navy Housing Facility, with its related Child Development Center and recreation areas. The Hawaii Air National Guard facility lies across South Sidewinder Road from the beach. The rocket launch, DOE, and underground fuel storage areas are located to the north, and the communication antenna fields are located to the south. (Pacific Missile Range Facility, Barking Sands, 1998)

The majority of the land on PMRF is used for military purposes. Some recreational land use occurs along the coast, with Majors Bay being the primary recreation use area. PMRF has severely restricted public access since September 2001 for security reasons. The potential for future public access to the installation's beaches, when not used during military operations, will continue to be evaluated. Land use surrounding the base is mainly agriculture (sugar cane and corn) and recreation (Polihale State Park).

3.1.8 NOISE—PACIFIC MISSILE RANGE FACILITY, KAUAI

Current sources of noise on PMRF include airfield operations (high-performance aircraft, cargo/passenger aircraft, helicopter operations), base operations (including exercise

support), and missile, rocket, and drone launches. Noise levels near the runway may average as high as day-night average sound level 75 A-weighted decibels (dBAs). Buildings in this area are insulated to achieve a noise reduction of up to 35 dBA. (Pacific Missile Range Facility, Barking Sands, 1998)

With the exception of aircraft flight, the existing noise levels at nearby structures are believed to be equal to or less than 55 dBA during the day (7:00 a.m. to 11:00 p.m.), and 45 dBA during the night (11:00 p.m. to 7:00 a.m.) (U.S. Department of the Navy, 1995).

3.1.9 SAFETY AND HEALTH—PACIFIC MISSILE RANGE FACILITY, KAUAI

Range Control is charged with surveillance, clearance, and real-time range safety. Range Safety Approval and Range Safety Operation Plan documents are required for all weapons systems using PMRF (Pacific Division, Natural Resources Management Branch, 1991). PMRF uses Range Commanders Council (RCC) Standard 321-97, *Common Risk Criteria for National Test Ranges*. RCC 321-97 sets requirements for minimally acceptable risk criteria to occupational and non-occupational personnel, test facilities, and non-military assets during range operations (Pacific Missile Range Facility, Barking Sands, 1998).

The Missile Flight Safety Officer at PMRF is responsible for establishing ground hazard areas and launch hazard areas (over water areas) beyond which no debris from an early flight termination is expected to fall. The hazard area is determined by size and flight characteristics of the missile, individual flight profile of each exercise or flight test, and reaction time between recognition of a flight malfunction and the decision to terminate flight. Any failure of the missile system that would cause debris to fall outside the ground hazard area would be detected by the Missile Flight Safety Officer who would terminate the missile flight before it could escape the hazard boundary. Data processed by ground-based or onboard missile computer systems may be used to recognize malfunctions and terminate missile flight. The Safety Officer monitors the flight continuously and always retains the capability to terminate the flight, if necessary. The range safety clearance procedures at PMRF are some of the most rigorous because of the extra sensors available. Before an operation is allowed to proceed, the range is determined cleared using inputs from ship sensors, visual surveillance of the range from aircraft and range safety boats, radar data, and acoustic information from a comprehensive system of sensors and surveillance from shore. The use of radars, explosives, and airspace is also monitored by the PMRF Safety Office.

Portions of the airspace in the vicinity of the amphibious landing beach are subject to management under Warning Area W-188 (see Airspace). In addition, the area of ocean about 500 meters (1,640 feet) offshore falls within the aircraft Accident Potential Zone located on the south approach of the airfield. (Pacific Missile Range Facility, Barking Sands, 1998)

3.1.10 WATER RESOURCES—PACIFIC MISSILE RANGE FACILITY, KAUAI

Bedrock, alluvium, and sand dunes make up hydraulically connected aquifers within the region. The bedrock is highly permeable, containing brackish water. The dune sand aquifer on which PMRF lies has a moderate hydraulic conductivity and moderate porosity. It consists of a lens of brackish groundwater that floats on seawater and is recharged by rainfall and by seepage from the underlying sediments. It is too brackish for plants and animals to consume. The nearest fresh groundwater sources are in the Napali formation at the inland edge of the coastal plain along the base of the Mana cliffs.

3.2 NIIHAU

3.2.1 BIOLOGICAL RESOURCES—NIIHAU

The vegetation of the island is dominated by non-native plant species and plant communities. The dominant vegetation type on Niihau is kiawe forest. This community dominates coastal as well as inland areas of the island and forms dense thickets in many locations. On the northern lowland areas, the kiawe forest is more open and forms a mixed coastal dry community, called the Ilima (*Sida fallax*) mixed shrub community. A dry coastal community, koa haole shrubland, often dominated by pure stands of koa haole (*Leucaena leucocephala*) occurs at scattered locations at higher elevations on the island. Small mixed stands of eucalyptus (*Eucalyptus sp.*) and common ironwood (*Casuarina equisetifolia*) occur in a few sheltered areas at higher elevations. Ironwood also occurs in coastal areas near the ocean. Scattered individuals of naio (*Myoporum sandwicense*) occur at higher elevations in a mixed kiawe/koa haole shrub association. A coastal dry herbland/grassland community is present along the northeastern coastal region of Niihau. The USFWS has proposed designating critical habitat for three plant species on Niihau.

The wildlife on Niihau is dominated by non-native species. Feral pigs, sheep, cattle, horses, donkeys, turkeys, quail, pheasants, and peacocks dominate the terrestrial vertebrate animal community. Large numbers of pigs and sheep freely roam the island. The common bird species are introduced species such as the spotted dove, cardinal, and mynah.

The Hawaiian duck, also known as Koloa maoli, Common moorhen, or Alae'ula; black-necked stilt or Ae'o, also known as the Hawaiian stilt; and the American/Hawaiian coot or 'Alae Ke'oke'o are federal and state listed endangered species found in and around the lakes (playas) on the southern part of Niihau. The endangered Hawaiian monk seal uses most of the coastline on Niihau to haul out, bask, and occasionally pup. The threatened green sea turtle has been observed to come ashore on selected beaches, and occasionally nests at some of these locations.

3.2.2 CULTURAL RESOURCES—NIIHAU

The island of Niihau is private property. According to a reconnaissance survey conducted in May 1987 by Dr. William Kikuchi of the Kauai Community College there are no signs of

permanent habitation and few cultural resource sites. Locations selected for RIMPAC activities were chosen to avoid sites with known cultural features.

3.3 KAULA

RIMPAC activities conducted at Kaula include GUNNEX and STWEX, as described in chapter 2.0.

Kaula comprises approximately 44 hectares (108 acres) used by the U.S. Navy for aircraft gunnery and inert ordnance target practice (figure 3-2). The rock islet is located 35 kilometers (19 nautical miles) southwest of Niihau. The ordnance impact area is limited to about 4 hectares (10 acres) of the island at the southeastern tip. The island is not inhabited, and there are no formal structures except for some targets, which are periodically replaced (U.S. Marine Corps, 2002). Public access to the island is restricted. (Pacific Missile Range Facility, Barking Sands, 1998)

3.3.1 AIRSPACE—KAULA

The island of Kaula encompasses two special use airspace areas: Restricted Airspace R-3107 over Kaula and Warning Area-187 surrounding the island (figure 3-2). Both areas are controlled by the Honolulu Combined Center Radar Approach Control on behalf of FACSFACPH.

3.3.2 BIOLOGICAL RESOURCES—KAULA

Low-growing shrubs or herbs that belong to a semi-arid and strand flora dominate the vegetation on Kaula, due to the strong, dry, and continuous winds. A small number of koa haole (*Leucaena leucocephala*) have been noted on the island. The vegetation composition includes 5 endemic (Hawaiian) species, 10 indigenous species, and 14 introduced (exotic) species. None of the species of plants known to occur on Kaula are listed as endangered or threatened. (Pacific Missile Range Facility, Barking Sands, 1998)

Twenty-six different species of seabirds have been observed on Kaula. These include three species of migratory shorebirds that occasionally stop on Kaula and six species of exotic (introduced) land birds are also found on the island in small numbers. None of these species is listed as endangered or threatened. (Pacific Missile Range Facility, Barking Sands, 2002)

According to the State Land Use Classification, Kaula is within a conservation use district protective subzone listed as a seabird sanctuary (Pacific Missile Range Facility, Barking Sands, 1998).

Kaula Banks around Kaula supports some of the best-developed coral reefs in the main Hawaiian Islands. The entire Bank has been identified as a habitat of concern. Monk seals

(*Monachus schauinslandi*) have been reported hauled out on the east side of the island. (U.S. Department of the Navy, 2001a)

The humpback whale occurs seasonally in the ocean waters off Kaula. The species is federally listed as endangered and is also protected under the Marine Mammals Protection Act. Four consecutive National Marine Fisheries Service humpback whale surveys conducted between 1976 and 1979 established that the humpback whale occurs in the nearshore waters of Kaula during the winter season on an annual basis (Pacific Missile Range Facility, Barking Sands, 1998).

Three species of sea turtles (hawksbill [*Eretmochelys imbricata*], green, and loggerhead [*Caretta caretta*] sea turtles, appendix B, table B-11) are known to occur in Hawaiian waters and may be present around Kaula. All three are listed as threatened or endangered species (Pacific Missile Range Facility, Barking Sands, 1998). See appendix E for a comprehensive description of marine biological resources that are present in Hawaiian waters.

3.3.3 CULTURAL RESOURCES—KAULA

There is no evidence of extensive human habitation on Kaula, although some evidence of visitation was noted during a 1976 survey by a State of Hawaii archaeologist. There are no sites on Kaula officially declared state or federal historic places as defined in EO 11593, *Protection and Enhancement of the Cultural Environment*. (Pacific Missile Range Facility, Barking Sands, 1998)

An archaeological survey of Kaula was performed on the summit in 1999. Six archaeological sites were found on the northern portion of the island. No sites were found on the southern portion inside the impact area. Due to the presence of unexploded ordnance, only a small portion of the impact area could be surveyed. (Pacific Division, Naval Facilities Engineering Command, undated)

References to Kaula have been noted in Hawaiian oral traditions. There are no confirmed historic resources or structures on the islet (Pacific Missile Range Facility, Barking Sands, 1998).

3.3.4 SAFETY AND HEALTH—KAULA

The primary safety and health concern associated with Kaula is the aerial inert bombing impact area; no other hazardous operations occur on the island. To minimize health and safety risks, a Surface Danger Zone surrounding Kaula was established for the primary purpose of ensuring an adequate margin of safety to non-participating personnel and equipment during gunnery training operations. (Pacific Missile Range Facility, Barking Sands, 1998). The Kaula Danger Zone is defined as the waters within a circular area with a radius of 5 kilometers (3 miles) having its center on Kaula at latitude 21° 39' 30", longitude 160° 32' 30" (Pacific Missile Range Facility, Barking Sands, 1998). In addition, because of the potential for unexploded ordnance on and just below the surface of the island and adjacent waters, the island and tidal shoreline are not open to unauthorized personnel. Prior to any

air-to-surface activities, an aircraft flies over the island and determines if the area is clear of non-participants and marine mammals before conducting the training. If the area is not clear, then the operation is cancelled and the presence of non-participants is reported to the Coast Guard. (Pacific Missile Range Facility, Barking Sands, 1998)

The U.S. Navy opens the Surface Danger Zone for fishing on weekends and holidays in accordance with 33 CFR 165.1406. The Commander Fleet Air Hawaii, as the controlling and scheduling agency for the military use of Kaula, is responsible for notifying the State of Hawaii Department of Land and Natural Resources, Division of Fish and Game, State of Hawaii, and Commander Fourteenth Coast Guard District, in writing, of the period of time the Surface Danger Zone will be opened for fishing (Pacific Missile Range Facility, Barking Sands, 1998). These agencies then make official notifications to the public.

For special operations, multiparticipants, or hazardous weekend firings, PMRF and FACSFACPH publish dedicated warning NOTAMs and Notices to Mariners (NOTMARs).

3.3.5 WATER RESOURCES—KAULA

Kaula has no known surface water. No information on groundwater resources, if any, is available for Kaula (Pacific Missile Range Facility, Barking Sands, 1998).

3.4 PEARL HARBOR, OAHU

RIMPAC activities conducted at Pearl Harbor include IN-PORT activities, AIROPS and C2, as described in chapter 2.0, in the areas shown in figure 2-2.

Pearl Harbor, on the southern shore of the island of Oahu, is a natural water body divided into three lochs by the Waipio and Pearl City peninsulas: West Loch, Middle Loch, and East Loch. The Pearl Harbor Naval Complex encompasses land along the eastern and southern shorelines of East Loch and Ford Island (figure 2-2). (Department of the Navy, Pacific Division Naval Facilities Engineering Command, 1992)

A major portion of the operations area at Pearl Harbor is used for maintenance and supply/storage largely located adjacent to ship berthing and repair areas. Other land uses are family and bachelor housing, support and headquarters facilities, and tank farms. Open areas are used for staging during large-scale exercises and operations. (Department of the Navy, Pacific Division Naval Facilities Engineering Command, 1992)

Pearl Harbor is listed as a National Historic Landmark since 1964. There are about 1,400 buildings and structures that are eligible for listing on the National Register of Historic Places (NRHP). Consultation with the SHPO would be required before performing any activity that may impact the National Historic Landmark.

3.4.1 AIRSPACE—PEARL HARBOR, OAHU

Airspace above Pearl Harbor and adjoining Hickam Air Force Base is restricted.

3.4.2 BIOLOGICAL RESOURCES—PEARL HARBOR, OAHU

Exotic imported grasses and trees maintained by intensive landscaping efforts make up the majority of the vegetative community at Pearl Harbor. Native vegetation, including grasses, trees, and shrubs are present only in small areas. These areas of native vegetation provide control for erosion except under the heaviest rainfall conditions. (Department of the Navy, Pacific Division, Naval Facilities Engineering Command, 1992)

Green sea turtles have been seen in the entrance to Pearl Harbor. Monk seals have been reported hauled-out on the beach at Iroquois Point housing area. There was a report of a humpback whale and calf entering Pearl Harbor in 1998 (Honolulu Star-Bulletin, 1998).

A cooperative agreement for the conservation and management of terrestrial and aquatic resources within Pearl Harbor has been developed with the U.S. Navy, USFWS, National Marine Fisheries Service, and the State of Hawaii Department of Land and Natural Resources (Department of the Navy, Pacific Division, Naval Facilities Engineering Command, 1992). Threatened and endangered bird species known to frequent the nearby Pearl Harbor National Wildlife Refuge are listed in appendix B, table B-2. There are no EFH areas of particular concern in Pearl Harbor.

3.4.3 SOCIOECONOMICS—PEARL HARBOR, OAHU

Pearl Harbor is located in the combined jurisdiction of the City and County of Honolulu, on Oahu. Honolulu is the State of Hawaii's financial center, as well as the site of the State Capitol and the county seat. About 75 percent of the population of Hawaii resides in Honolulu County.

The 2000 population of Honolulu County, Oahu, was 876,156 (U.S. Census, 2000). This figure included 78,383 military personnel and dependents, or 9 percent of Oahu's population.

Oahu accounted for about 72 percent of Hawaii's visitor arrivals in 1996. The 4.9 million visitors were accommodated in over 35,000 hotel and apartment-hotel units in Honolulu, as well as other facilities at the military bases on the island.

Other factors reinforce Honolulu's role as the population and economic center of Hawaii. Oahu is the state's primary air and sea gateway. Honolulu International Airport is described as one of the world's busiest, and in 1994 the port on Oahu received over 1,600 ship arrivals carrying 5.9 million metric tons (6.5 million tons) of cargo.

Pearl Harbor has been an active naval station since 1908 and has grown into a highly developed community in its own right. It comprises a network of shops, churches, clubs, restaurants, recreational facilities and offices, forming a hub for Hawaii's U.S. Navy and U.S. Marine Corps personnel.

Pearl Harbor is one of the nation's largest and most important naval bases, housing 81,000 military, family members, and civilian workers. In 1995, expenditures by the U.S. Navy and U.S. Marine Corps community were estimated to be more than \$1 billion. (Beneco Enterprises, Inc., 1998)

3.5 IROQUOIS LAND/UNDERWATER RANGE, OAHU

Ongoing RIMPAC activities at Pu'uloa, southwest of Keahi Point, include underwater demolition activities, as described in chapter 2.0, at the location shown in figure 2-2. The range boundary is 7 square kilometers (2 square nautical miles) and oriented parallel to the shore at Ewa Beach, west of the mouth of Pearl Harbor. Water depths range from about 2.9 meters (1.5 fathoms, or 9 feet) near shore to a maximum depth approaching 73.5 meters (38 fathoms, or 228 feet) in the southwest corner. The majority of the range is less than 12.6 meters (6.5 fathoms, or 39 feet) in depth.

3.5.1 BIOLOGICAL RESOURCES—IROQUOIS LAND/UNDERWATER RANGE, OAHU

Exotic imported grasses and trees maintained by intensive landscaping efforts make up the majority of the vegetative community at Pearl Harbor. Native vegetation, including grasses, trees, and shrubs are present only in small areas. These areas of native vegetation provide control for erosion except under the heaviest rainfall conditions. (Department of the Navy, Pacific Division, Naval Facilities Engineering Command, 1992)

Green sea turtles have been seen in the entrance to Pearl Harbor. Monk seals have been reported hauled-out on the beach at Iroquois Point housing area. There was a report of a humpback whale and calf entering Pearl Harbor in 1998. (Honolulu Star-Bulletin, 1998)

A cooperative agreement for the conservation and management of terrestrial and aquatic resources within Pearl Harbor has been developed with the U.S. Navy, USFWS, National Marine Fisheries Service, and the State of Hawaii Department of Land and Natural Resources (Department of the Navy, Pacific Division, Naval Facilities Engineering Command, 1992). Threatened and endangered bird species known to frequent the nearby Pearl Harbor National Wildlife Refuge are listed in appendix B, table B-2. There are no EFH areas of particular concern in Pearl Harbor.

3.6 PU'ULOA UNDERWATER RANGE, OAHU

Ongoing RIMPAC activities at Pu'uloa, southwest of Keahi Point, include underwater demolition activities, as described in chapter 2.0, at the location shown in figure 2-2. The range boundary is 7 square kilometers (2 square nautical miles) and oriented parallel to the shore at Ewa Beach, west of the mouth of Pearl Harbor. Water depths range from about 2.9 meters (1.5 fathoms, or 9 feet) near shore to a maximum depth approaching 73.5 meters (38 fathoms, or 228 feet) in the southwest corner. The majority of the range is less than 12.6 meters (6.5 fathoms, or 39 feet) in depth.

3.6.1 BIOLOGICAL RESOURCES—PU'ULOA UNDERWATER RANGE, OAHU

Nine marine wildlife species listed as federal and state threatened or endangered species are known or suspected to exist in Hawaiian waters, although the nearshore environment at Pu'uloa may be too shallow for frequent use. These species include the Hawaiian monk seal, blue whale (*Balaenoptera musculus*), fin whale (*Balaenoptera physolus*), humpback whale, sei whale (*Balaenoptera borealis*), sperm whale (*Physeter macrocephalus*), hawksbill turtle, green sea turtle, and loggerhead sea turtle (appendix B, table B-11). A description of these listed species is provided in the PMRF Enhanced Capability EIS.

A variety of other whales and dolphins not listed as threatened or endangered are found around the Hawaiian Islands, including the Minke whale (*Balaenoptera acutorostrata*) and Bryde's whale (*Balaenoptera edeni*). These whales have been identified both by visual sighting and by acoustic surveys. More than 20 species of toothed whales and dolphins are known to exist around the islands, including those most frequently seen: spinner dolphin (*Stenella longirostris*), spotted dolphin (*Stenella attenuata*), bottlenose dolphin (*Tursiops truncatus*), short finned pilot whale (*Globicephala macrorhynchus*), false killer whale (*Pseudorca crassidens*), and sperm whale (*Physeter catadon*). The spinner dolphin is commonly seen on the leeward side of all of the main Hawaiian Islands. Spotted dolphins are usually located near the spinners in deeper waters, while the bottlenose dolphins frequent both shallow and deep areas.

A benthic survey was conducted in 2001 (U.S. Department of the Navy, 2001a) in close proximity and depth range to the Pu'uloa Underwater Range. The survey indicated that corals ranged from locally abundant on the northern inshore reef slope at Ewa Beach to uncommon on the broad sandy slopes on the south (seaward) side of the surveyed area. Coral coverage ranged from 80 to 90 percent at depths between 18 and 24 meters (58 and 78 feet) to less than 1 percent in water depths from 24 to 36 meters (78 to 120 feet). The coral community was dominated by *Pocillopora meandrina*, *Porites lobata*, and *Porites compressa*.

Coastal waters of the Ewa Plain receive nutrient rich water from springs below sea level. The nutrients in this water come from upland agricultural fertilization, leaching from cesspools and septic tanks, domestic waste injection wells, and urban application of fertilizers. These extra nutrients promote the growth of benthic algae (limu). The Ewa

Beach area is a popular seaweed harvesting area on Oahu. Organisms offshore of Ewa Beach include corals, several species of sea cucumber, sea urchins, and colonial soft corals. A few species of reef fish are also present in low numbers in the littoral waters. Macroalgae (seaweed) is very abundant in the offshore areas. (State of Hawaii, 2001)

A diverse and abundant fish fauna was generally associated with the deeper (greater than 40 meters [120 feet]) areas containing coral coverage and vertical relief. This type of area has been designated by the National Oceanic and Atmospheric Administration as HAPC. During the April 2001 survey, the most common families represented were surgeonfishes (acanthurids), butterflyfishes (chaetodontids), damselfishes (pomacentrids), wrasses (labrids), triggerfishes (balistids) and moorish idols (zanclidae). Earlier studies identified 59 species of fishes in the vicinity of Ewa Beach, of which 20 were regarded as abundant (U.S. Department of the Navy, 2001a).

3.6.2 LAND USE—PU'ULOA UNDERWATER RANGE, OAHU

The northern range boundary is approximately 1.4 kilometers (0.75 nautical mile) from Ewa Beach, a public beach. The Defensive Sea Area (restricted surface waters adjacent to Pearl Harbor) comprises the eastern half of the range. There are no restrictions to commercial or recreation activities at Ewa Beach. Ocean activities occurring at Ewa Beach include netting, fishing, tropical fish collecting, surfing, scuba diving, paddling, kayaking, and shelling. A commercial net pen cage aquaculture site is located in close proximity to the western range boundary (U.S. Department of the Navy, 2001a).

3.6.3 SAFETY AND HEALTH—PU'ULOA UNDERWATER RANGE, OAHU

All demolition activities would be conducted in accordance with COMNAVSURFPAC Instruction 3120.8D (Department of the Navy, 1993).

3.7 BARBERS POINT UNDERWATER RANGE, OAHU

The Barbers Point Underwater Range will support DEMO exercises and possible AIROPS, as described in chapter 2.0. The Barbers Point underwater range comprises a narrow strip of nearshore ocean that directly fronts the entire southern boundary of the former NAS Barbers Point (figure 2-7). NAS Barbers Point was closed as part of the Base Realignment and Closure in July 1998 and renamed the Kalaeloa Airport. The Coast Guard Air Station and the National Guard still occupy portions of the original base near the shoreline.

3.7.1 BIOLOGICAL RESOURCES—BARBERS POINT UNDERWATER RANGE, OAHU

Biological resources are similar to those described previously for the Pu'uloa Underwater Range (section 3.6.1).

3.7.2 LAND USE—BARBERS POINT UNDERWATER RANGE, OAHU

The northern range boundary is the high water mark of the beach fronting the beach at Kalaeloa Airport. It aligns with what was once the station boundary of the closed NAS Barbers Point. The Coast Guard Air Station Barbers Point is across the street from the beach and covers a third of the shore of the original installation. Currently, beach activities including netting, fishing, topical fish collecting, surfing, scuba diving, paddling, kayaking, and shelling are not constrained.

3.7.3 SAFETY AND HEALTH—BARBERS POINT UNDERWATER RANGE, OAHU

All demolition activities are conducted in accordance with COMNAVSURFPAC Instruction 3120.8D (Department of the Navy, 1993).

3.8 COAST GUARD AIR STATION BARBERS POINT/KALAELOA AIRPORT, OAHU

Coast Guard Air Station Barbers Point is located on Kalaeloa Airport, which was formerly the active airfield portion of NAS Barbers Point. Kalaeloa Airport is a general aviation facility that uses 300 hectares (750 acres) of the former Naval facility. The state operates the three runways at the airport, the control tower and support facilities. General aviation facilities on the South Ramp of Honolulu International Airport are to be relocated to this facility. In addition, space will be made available to fixed base operators at Kalaeloa Airport (State of Hawaii Department of Transportation, 2002).

Under federal mandates of the Base Realignment and Closure Act, the U.S. Navy vacated NAS Barbers Point on 1 July 1999. Effective on 2 July 1999, ownership of the airport was transferred to the State of Hawaii and the name changed to Kalaeloa Airport. In conjunction with the Navy's departure, the existing military Tactical Air Navigation and Instrument Approach Procedures to NAS Barbers Point were decommissioned. The current airspace areas associated with NAS Barbers Point are described in FAA Order 7400.9J, *Airspace Designations and Reporting Points*. FAA Order 7400.9 is revised periodically; FAA Order 7400.9J is effective until 15 September 2002.

3.8.1 AIRSPACE—COAST GUARD AIR STATION BARBERS POINT/KALAELOA AIRPORT, OAHU

Search and rescue is the primary mission of Coast Guard Air Station Barbers Point is Search and Rescue within the Pacific Maritime Region. As the sole Coast Guard Air unit in this area of the Pacific, Coast Guard Air Station Barbers Point is responsible for a vast area including such island chains as the Hawaiian, Marianas, Carolines, and Marshalls. To accomplish its assigned missions, the Coast Guard uses four Aerospatiale HH-65A "Dolphin" short range recovery helicopters and four Lockheed HC-130H "Hercules" long range search aircraft. (GlobalSecurity.org, 2002)

Effective 13 September 1999, Kalaeloa Airport airspace was redesignated due to NAS Barbers Point Tactical Air Navigation decommissioning. The airspace itself was kept essentially the same by redesignating geographical references. The airport Class D and E airspace is described below.

Kalaeloa Airport Class D airspace is that airspace extending from the surface up to and including 762 meters (2,500 feet) mean sea level within a 6.9-kilometer (4.3-mile) radius of Kalaeloa Airport, excluding the airspace within the Honolulu, Hawaii, Class B airspace area. This Class D airspace area is effective during the specific dates and times established in advance by a NOTAM.

Kalaeloa Airport Class E airspace is that airspace extending up from the surface within a 6.9-kilometer (4.3-mile) radius of Kalaeloa Airport, excluding the airspace within the Honolulu, Hawaii, Class B airspace area. This Class E airspace area is effective during the specific dates and times established in advance by a NOTAM.

As noted in following section 3.9, NAS Barbers Point aviation activity was relocated to Marine Corps Base Hawaii at Kaneohe on the northeast coast of Oahu.

3.8.2 BIOLOGICAL RESOURCES—COAST GUARD AIR STATION BARBERS POINT/KALAELOA AIRPORT, OAHU

Coast Guard Air Station Barbers Point occupies a portion of the 304-hectare (750-acre) Kalaeloa Airport. As such, there are few biological resources associated directly with the facility. However, the Kalaeloa Airport is utilized by birds, feral dogs and cats, rodents, and mongoose. Birds are the most common form of wildlife on the area and include the black-crowned night heron, great frigate bird, Pacific golden plover, sanderling, wandering tattler, ruddy turnstone, zebra dove, Japanese white-eye, northern cardinal, red-crested cardinal, and vented bulbul. Open areas are grassed and maintained. (State of Hawaii, 2001)

3.9 MARINE CORPS BASE HAWAII, OAHU

RIMPAC activities at Marine Corps Base Hawaii include AMPHIBEX landings and back-loadings, a base of operations for SPECWAROPS, and the HAO/NEO exercise, including LCAC landings, direct action exercises, and boat raids as described in chapter 2.0. The port area will be used for transport boats and the helicopter runway area will be used for transport helicopters. HA/DR exercises also may be conducted at Marine Corps Base Hawaii.

Marine Corps Base Hawaii is a 1,194-hectare (2,951-acre) reservation on Mokapu Peninsula on the northeast side of the Island of Oahu (figure 2-4). The base is bounded by water on three sides: Kaneohe Bay, the Pacific Ocean, and Kailua Bay. The Nu'upia Pond

Wildlife Management Area lies in the isthmus between the base and the mainland. (U.S. Pacific Command, 1995b)

3.9.1 AIRSPACE—MARINE CORPS BASE HAWAII, OAHU

Marine Corps Base Hawaii is the current home of several marine aviation units. Airfield clear zones radiate from the two airfields and extend over the Kaneohe Bay and Pacific Ocean. (U.S. Pacific Command, 1995b)

Marine Aircraft Group 24 (MAG-24) operates the entire U.S. Marine Corps inventory of active Sikorsky CH-53D Sea Stallion helicopters. In addition to providing aircrew training, the unit's mission includes combat assault support. (Marine Corps Base Hawaii, 2002)

Patrol Squadron Four (VP-4), Patrol Squadron Nine (VP-9), and Patrol Squadron Forty-Seven (VP-47) fly the Lockheed P-3C Orion in the patrol and antisubmarine warfare role. Special Projects Patrol Squadron Two (VPU-2) also flies the P-3B and P-3C versions of the Orion. (U.S. Department of the Navy, 2002)

Helicopter Antisubmarine Squadron Light Thirty-Seven (HSL-37) operates the Sikorsky SH-60B Seahawk helicopter. (Marine Corps Base Hawaii, 2002)

The U.S. Naval Reserves Fleet Logistics Support Squadron Five One (VR-51) flies two Gulfstream C-20G Gulfstream IV aircraft in the logistical support role. (Marine Corps Base Hawaii, 2002)

3.9.2 BIOLOGICAL RESOURCES—MARINE CORPS BASE HAWAII, OAHU

No threatened or endangered flora or sensitive habitats occur on the three landing sites at Marine Corps Base Hawaii. These beaches are Hale Koa/West Field, Pyramid Rock, and Fort Hase. There is a fourth landing site at the base fuel pier ramp. Threatened green sea turtles (*Chelonia mydas*) frequent the inshore waters at all three landing beaches, and are especially abundant in the Hale Koa Beach/West field area where they forage on seagrass (*Halophila ovalis*). The endangered Hawaiian monk seal (*Monachus schauinslandi*) has occasionally hauled out on Pyramid Rock beach. In 1996, a monk seal gave birth on a small beach near recreational cabins north of West Field. Migrating endangered humpback whales (*Megaptera novaeangliae*) occur in deeper offshore waters during winter months, often coming close to shore at Pyramid Rock Beach.

The near shore area at Pyramid Rock beach is composed primarily of sand and exposed, barren basalt with limited coral coverage by small colonies of cauliflower coral (*Pocillopora meandrina*). The landing site corresponds with a wide sand channel that extends several hundred yards offshore. Dune vegetation consists of naupaka (*Scaevola sericea*) thickets interspersed with clusters of sea grape (*Coccoloba uvifera*). Along the seaward side of the naupaka is a mat of beach dropseed grass (aki'aki or *Sporobolus virginicus*) and morning glory (pohuehue or *Ipomoea pescaprae*). At Fort Hase Beach, the seafloor is composed of

a flat limestone platform dominated by brown algae (*Distyopteris australis*). Sparse colonies of live coral (less than 10 percent coverage) occur in deeper waters offshore. Ironwood trees are also present at the Hale Koa/West Field landing area.

The terrestrial habitat typically consists of sparse ground cover composed of indigenous grasses and shrubs. Several colonies of *Pocillopora meandrina* grow on exposed basalt rock surfaces.

An extensive reef flat extends seaward from Hale Koa/West Field Beach with no observed live coral for about 100 meters (328 feet). Approximately 15 percent live coral coverage begins about 200 to 300 meters (656 to 984 feet) from shore. Natural channels exist in the reef flats that allow access to the Hale Koa/West Field and Fort Hase beach landing area. The craft landing zone and vehicle staging areas on Hale Koa/West Field are asphalt-paved and are currently used for helicopter confined area landings. Migratory birds such as the Pacific golden-plover (*Pluvialis fulva*) and ruddy turnstone (*Arenaria interpres*) have been observed foraging and resting on the landing beaches. Seabirds, including the great frigate bird (*Fregata minor*) and brown noddy (*Anous stolidus*) have been seen foraging offshore.

3.9.3 CULTURAL RESOURCES—MARINE CORPS BASE HAWAII, OAHU

A Cultural Resource Assessment of the Marine Corps Base Hawaii was performed in May 1997. Hale Koa/West Field Beach was created with dredged fill during World War II and contains no cultural resources or human remains. Hale Koa/West Field's additional runway was created with fill as part of the World War II base expansion. The area has no potential for cultural resources or discovery of human remains. The Pyramid Rock Beach landing and staging areas contain no cultural resources or human remains. The Mokapu Burial Area is listed on the NRHP, and a site containing archaeological deposits are located inland from the landing site. The landing and staging areas at Fort Hase Beach are within a zone classified as having a low archaeological sensitivity. A ground-penetrating radar survey of the landing and staging areas detected no cultural deposits or burials and confirmed that the areas were previously disturbed (Yamada, 2002).

3.9.4 NOISE—MARINE CORPS BASE HAWAII, OAHU

The military landing field adjacent to Marine Corps Base Hawaii is the main existing noise generator. The Air Installation Compatible Use Zone (AICUZ) generated from Marine Corps Base Hawaii air operations covers all of Coconut Island and a portion of Kealohi Point. Flight patterns have been adjusted so that most of the AICUZ is over the waters of Kaneohe Bay (U.S. Pacific Command, 1995b). U.S. Navy flight activities shifted from NAS Barbers Point to Marine Corps Base Hawaii in mid-1999. (Pacific Division, Naval Facilities Engineering Command, 1997)

Major noise sources include helicopter and fixed-wing aircraft activities, as well as amphibious training, including LCAC activities. Day-night level (DNL) measurements fall within the 70- to 75-dBA range during periods of active runway use or amphibious training.

Hale Koa Beach is about 100 meters (328 feet) southeast of the helicopter landing areas on West Field and about 670 meters (2,198 feet) northwest of an active runway, and thus reflects noise levels similar to those referenced above. During periods free of such activities, a DNL equal to or less than 55 dBA would be expected during the day, falling to less than 45 dBA in the evening and night hours.

3.10 HICKAM AIR FORCE BASE, OAHU

RIMPAC exercises conducted at Hickam Air Force Base include Command and Control, AIROPS, and SPECWAROPS activities as described in chapter 2.0. Hickam Air Force Base now consists of 1,153 hectares (2,850 acres) of land and facilities valued at more than \$444 million. Hickam Air Force Base is located on the south side of Oahu next to the Honolulu International Airport.

3.10.1 AIRSPACE—HICKAM AIR FORCE BASE, OAHU

The Hickam Air Force Base shares its runways with the adjacent Honolulu International Airport. Hickam Air Force Base and the Honolulu International Airport constitute a single airport complex operated under a joint-use agreement.

3.10.2 BIOLOGICAL RESOURCES—HICKAM AIR FORCE BASE, OAHU

The USFWS conducted a site visit to coastal areas of Hickam Air Force Base (which is adjacent to Pearl Harbor) with U.S. Air Force personnel in fiscal year 2001. The USFWS assessed biological resources in coastal strand, wetland and estuarine areas, and determined major threats to the habitat exist. The U.S. Air Force is planning weed-clearing projects to open up feeding habitat for a species of endangered Hawaiian waterbird and outplanting native coastal vegetation. This area is used as a field trip site for local elementary school science classes and is the site of community service projects. (U.S. Fish and Wildlife Service, 2001)

3.10.3 CULTURAL RESOURCES—HICKAM AIR FORCE BASE, OAHU

In October 1980, the Secretary of the Interior designated Hickam Air Force Base as a National Historic Landmark, recognizing it as one of the nation's most significant historic resources associated with World War II in the Pacific.

3.11 MARINE CORPS TRAINING AREA BELLOWS/BELLOWS AIR FORCE STATION, OAHU

RIMPAC exercises conducted at Marine Corps Training Area Bellows at Bellows Air Force Station include AMPHIBEX, and possibly HAO/NEO and HA/DR activities as described in chapter 2.0. Bellows Air Force Station is a 635-hectare (1,568-acre) military reservation

on the southeast coast of Oahu (figure 2-4). The inactive airfield in the center of the site is limited to rotary wing activity, and is occasionally used for U.S. Marine Corps helicopter training. About 157 hectares (387 acres) of the airfield is proposed to be converted to expand space available for ground and aviation training, offering sufficient area for company-sized amphibious exercises to train for the transition from beach landings to combat ashore. (U.S. Department of the Navy, 1995)

In addition to RIMPAC, amphibious landing exercises for the U.S. Navy Third Fleet occur routinely at Marine Corps Training Area Bellows/Bellows Air Force Station during about 2 weeks of each quarter. LCACs and AAVs can exit the beach area via a concrete ramp and cross Tinkers Road. This allows the amphibious units to continue their training in other areas of Marine Corps Training Area Bellows. Live fire training is not conducted at Marine Corps Training Area Bellows/Bellows Air Force Station maneuver training areas. (U.S. Department of the Navy, 1995)

3.11.1 AIRSPACE—MARINE CORPS TRAINING AREA BELLOWS/BELLOWS AIR FORCE STATION, OAHU

Airspace requirements for Bellows Air Force Station are nominal because aviation is limited to rotary wing activity. Two Takeoff Safety Zones and Approach-Departure Clearance Surfaces are delineated over the runways and do not extend off-base. In addition, there are two water drop zones that are suitable for helicopter, parachute, and helicast training. These areas are designed to avoid overflight of inhabited areas and wildlife sanctuaries. (U.S. Pacific Command, 1995a)

3.11.2 BIOLOGICAL RESOURCES—MARINE CORPS TRAINING AREA BELLOWS/BELLOWS AIR FORCE STATION, OAHU

Vegetation at Bellows Air Force Station was surveyed in 1994. Major vegetation groups include ironwood forest, koa haole/christmasberry shrubland, mixed introduced forest, and wetlands. All the vegetation communities are dominated by introduced species and exhibit signs of human and grazing animal disturbance. No threatened or endangered plant species were identified during the survey and none are expected to occur at Bellows Air Force Station. Only 12 percent of the species recorded were native species. Three endemic, but not sensitive or rare, species were identified: ko'olo'olau (*Bidens sandvicensis*), kauna'oa (*Cuscuta sandwichiana*), and nama (*Nama sandwicensis*). (U.S. Pacific Command, 1995a)

There are no live coral colonies in the nearshore areas as a result of redistribution of sand and scouring caused by wave action. The seafloor out to a distance of 150 meters (492 feet) from the beach consists of a sand flat, beyond which a low-relief fossil reef platform becomes interspersed with the sand. The outer barrier reef crest is an actively accreting coral reef habitat comprised predominantly of the genera *Pocillopora*, *Porites*, and *Montipora*. There are two well-defined sand channels that extend from the shoreline through the barrier reef to the open ocean beyond.

Although no wetlands have been delineated at Bellows Air Force Station, five small areas exhibit wetland characteristics. These areas provide habitat for many native and migratory birds, including several endangered bird species (appendix B, table B-10). (U.S. Pacific Command, 1995a)

Green sea turtles occur frequently in the nearshore water off Bellows Air Force Station (appendix B, table B-10). Also occasionally feeding in these waters are hawksbill turtles. Hawaiian monk seals have been sighted in the area. Waimanalo Bay is expected to be too shallow for the presence of whales, such as the humpback whale, which winters in the Hawaiian Islands. However, it is not outside the realm of possibility that an occasional humpback whale could use Waimanalo Bay. (U.S. Pacific Command, 1995)

3.11.3 CULTURAL RESOURCES—MARINE CORPS TRAINING AREA BELLOWS/BELLOWS AIR FORCE STATION, OAHU

A literature review of the cultural resources at Bellows Air Force Station was conducted in 1994. Eighteen archaeological sites were identified. Several sites are located within the runway complex. Most archaeological sites are subsurface archaeological remains, including potential burial sites at isolated locations. Many are potentially eligible for listing on the NRHP. (U.S. Pacific Command, 1995a)

3.11.4 LAND USE—MARINE CORPS TRAINING AREA BELLOWS/BELLOWS AIR FORCE STATION, OAHU

Bellows Air Force Station consists of two services. The northern half is under the U.S. Air Force and is used for recreational activities since 1967. The U.S. Marines currently control the southern portion known as Marine Corps Training Area Bellows. The Marine beach area is open to the public from noon Friday to 8:00 a.m. Monday.

3.11.5 NOISE—MARINE CORPS TRAINING AREA BELLOWS/BELLOWS AIR FORCE STATION, OAHU

Acceptable noise levels depend on the receiving land uses. According to federal standards that are the most widely used, sound levels are depicted in terms of a continuous equivalent sound level (L_{eq}), which is a single statistic that represents an average noise level. The standard acceptable indoor noise level is 55 dBA, the threshold at which noise interferes with normal daily activities. Outdoor noise levels of 65 dBA are acceptable for most residential land uses because it is assumed that the structure of the residence reduces sound levels by approximately 10 decibels. Sensitive noise receptors, such as schools, hospitals, libraries, and nursing homes, require more protection from obtrusive noise. The acceptable outdoor noise threshold for these land uses is 55 dBA.

Ambient noise levels are dominated by surf, wind, and highway noise. During the existing military training exercises, including beach landing and helicopter operations, the estimated average sound level (L_{eq}) is well within daytime residential criteria for noise exposure (55

dB(A). Sensitive noise receptors exist in the neighborhood immediately adjacent to Bellows Air Force Station.

3.12 KAHUKU TRAINING AREA, OAHU

RIMPAC activities at Kahuku Training Area include landing zone reconnaissance, CSAR, TRAP, and R&S by units of 2 to 20 personnel, as described in chapter 2.0. The RIMPAC exercise area is shown in figure 2-11.

Kahuku Training Area consists of 3,786 hectares (9,355 acres) of land, most of which is in a state-designated conservation district. The land was recently purchased by the U.S. Army (U.S. Department of the Army, 1999).

The Kahuku Training Area is one of the more widely used military training areas in Hawaii and fulfills a vital need for maneuver training on Oahu. U.S. Army Reserve, National Guard, and Marine Corps units also use this area. Kahuku Training Area is used by the U.S. Army for mountain and jungle warfare training, as well as tactical maneuver training with both rotary and fixed wing aircraft.

With 1,860 hectares (4,596 acres) suitable for maneuvers, the training area is the largest contiguous training area on Oahu that can accommodate up to company-size troop units. The training area has accommodated one of the four infantry battalion Army Training and Evaluation Program missions. (U.S. Army Garrison, Hawaii and U.S. Army Corps of Engineers, 1997a) No live fire or incendiaries are allowed at Kahuku Training Area (U.S. Pacific Command, 1995b).

The Opana Communications Facility uses 4 hectares (9 acres) of the Kahuku Training Area and includes a telecommunications center with several satellite terminals.

3.12.1 AIRSPACE—KAHUKU TRAINING AREA, OAHU

Helicopter overflights and maneuvers are the most common activities above the Kahuku Training Area. Military operations occur within Restricted Airspace A-311 (figure 2-6).

3.12.2 BIOLOGICAL RESOURCES—KAHUKU TRAINING AREA, OAHU

Eighteen rare plant types have been identified at Kahuku Training Area, of which ten are federally listed as endangered (appendix B, table B-3). There have also been eight rare animal species identified. These include six varieties of tree snail (*Achatinella* sp.), four of which are listed as endangered, and two rare birds including the Oahu Elepaio (*Chasiempis sandwichensis ibidis*), a species federally listed for endangered status 18 May 2000 (appendix B, table B-4). Critical habitat was officially designated for the Oahu Elepaio on 10 December 2001 that encompasses areas in the Koolau and Waianae Mountain Ranges on Oahu. Five biologically significant areas occur in the southern and middle western

portion of the training area. (U.S. Army Garrison, Hawaii, and U.S. Army Corps of Engineers, 1998a)

3.12.3 CULTURAL RESOURCES—KAHUKU TRAINING AREA, OAHU

The Ecosystem Management Plan Report has identified six separate archaeological management areas in the Kahuku Training Area. Sites identified include the Waikane Stone, Puuala *Heiau*, ditch—terrace—and platform remains, an agricultural terrace complex and 14 agricultural sites, pre-contact habitation sites, a religious site, Hanakoa Platform (a registered NRHP site) and Opana Radar Station (a National Historic Landmark). Areas closest to the coast have the highest probability of containing archaeological resources, which could include permanent habitation deposits and religious sites. (U.S. Army Garrison, Hawaii, and U.S. Army Corps of Engineers, 1998a)

All archaeological sites identified in the Kahuku Training Area would be considered significant under Criterion D of the National Historic Preservation Act as resources that may yield (or have yielded) important prehistorical or historical information. In addition, religious sites would also be significant due to their cultural importance to Native Hawaiians. (U.S. Army Garrison, Hawaii, and U.S. Army Corps of Engineers, 1998a)

3.13 MAKUA MILITARY RESERVATION, OAHU

Ongoing RIMPAC activities at Makua Military Reservation include SPECWAROP inserts by helicopter and vehicle and live fire exercises as described in chapter 2.0. The location of potential RIMPAC activities is shown on figure 2-9.

Makua Military Reservation is a Department of the Army reservation containing a total of 1,695 hectares (4,190 acres) in the Makua Valley on the northwestern side of Oahu. Makua Military Reservation extends from the Farrington Highway along the west coast eastward to the ridgeline of the Waianae Mountains. It is used for varied military training, such as bivouacs and tactical assaults, and infantry and helicopter gunnery exercises (U.S. Pacific Command, 1995b).

3.13.1 AIRSPACE—MAKUA MILITARY RESERVATION, OAHU

Makua Military Reservation is occasionally used for helicopter overflights. Military operations occur within Restricted Airspace R-3110 and R-3109 (National Imagery and Mapping Agency, 1997). Civilian use dominates the airspace.

3.13.2 BIOLOGICAL RESOURCES—MAKUA MILITARY RESERVATION, OAHU

The biota of Makua is diverse and has been extensively studied and documented. Three native ecological zones have been identified within Makua. The U.S. Army delineated

these zones based on elevation, topography, and prevailing climatic conditions within the Reservation, resulting in three designations:

- Ridge Crest Vegetation Zone
- Native Shrub on Cliff and Slope Zone
- Lowland Native Forest Zone

The ecological subzones and plant and animal biota within each of these have also been well documented.

Two biologically sensitive areas that are the habitat of threatened and endangered plant and animal species within the boundaries of the Reservation. The U.S. Army has designated management units where listed species are concentrated, and where many of the conservation stabilization actions are focused. Records dating back to 1970 indicate that on Makua there are 32 listed plants (all endangered), two endangered birds, one endangered mammal, and one endangered snail.

In addition to native species, introduced nuisance species such as pigs, rats, and goats adversely affect range habitat. The U.S. Army has implemented measures, including more than 11 kilometers (7 miles) of fencing, to control the movement of pigs and goats onto the range.

The U.S. Army began consultations with the USFWS in 1989-1991 under Section 7 of the Endangered Species Act for the Oahu tree snail. The following restrictions were established for training at Makua and resulted in a 1991 "no-jeopardy" Biological Opinion from the USFWS:

- The use of high fire-risk ordnance such as tracers and rockets is prohibited.
- Fire-causing high explosive and tracer munitions cannot be fired at areas outside the existing firebreak road.
- The Army provides the USFWS with a semi-annual report of all fires escaping immediate control.

In 1998, Section 7 consultation with USFWS to determine if routine military training at Makua would jeopardize the continued existence of 41 endangered species. In 1999, the USFWS issued a Biological Opinion concluding that the routine military training would not jeopardize the endangered species if certain conditions were met. These include restrictions to military training, and preparation and implementation of a Wildland Fire Management Plan. The U.S. Army is also required to complete an Implementation Plan to stabilize the targeted plant and animal populations.

3.13.3 CULTURAL RESOURCES—MAKUA MILITARY RESERVATION, OAHU

The traditional and cultural use of Makua is extensive. Historic records, oral histories, and archaeological studies dating back to the 19th century document the extensive cultural heritage of the area, including both religious and domestic use of Makua by native peoples (U.S. Army Engineering and Support Center, 2001).

Recent archaeological surveys of Makua Military Reservation have identified 41 known archaeological sites. These sites consist of agricultural or habitation complexes, fishing shrines, walls, terraces, and mounds. There is also a high probability of additional sites in some of the eastern valley areas not yet surveyed. Many of these sites are located adjacent to the training area, and some of the training areas have restrictions as listed in table 2-3. The U.S. Army and the U.S. Army Corps of Engineers have identified the locations of these sites and are currently developing a management plan for the protection of cultural resources. (U.S. Army Garrison, Hawaii, and U.S. Army Corps of Engineers, 1998a)

Of the 41 known archaeological sites, 17 are within the currently proposed training area. Twenty-five percent of the lands at Makua have been surveyed for the presence of archaeological sites.

On 18 September 2000, a National Historic Preservation Act Section 106 Programmatic Agreement finalized with the SHPO and the Advisory Council on Historic Preservation (ACHP). This agreement was developed in consultation with aboriginal/indigenous Hawaiian groups and regulatory agencies over a period of 2 years. It contains specific programs and efforts to protect and mitigate impacts to cultural resources at Makua. Studies under this agreement are currently in progress (U.S. Army Engineering and Support Center, 2001).

3.13.4 NOISE—MAKUA MILITARY RESERVATION, OAHU

The Makua Military Reservation generates noise and vibration from its operations, including infantry and helicopter gunnery training exercises (U.S. Pacific Command, 1995b). No noise survey has been performed at the beach, but the common noise sources other than military activity include low background noise levels from wind, surf, and light highway traffic. (U.S. Army Garrison, Hawaii, and U.S. Army Corps of Engineers, 1997a)

The primary ambient noise is the result of surf action and wind. With the exception of aircraft flight, the existing noise levels at nearby structures are believed to be equal to or less than 55 dBA during the day (7:00 a.m. to 10:00 p.m.), and 45 dBA during the night (10:00 p.m. to 7:00 a.m.). The nearest housing is 305 to 915 meters (1,000 to 3,000 feet) down the beach that is adjacent to Makua Military Reservation. (U.S. Army Garrison, Hawaii, and U.S. Army Corps of Engineers, 1997a)

Small arms, demolition, mortar, artillery, and aircraft gunnery activities all generate noise at Makua. Federal and state laws concerning environmental noise for Army training activities have been implemented. Actual noise measurements in 1989, when the U.S. Army was conducting training activities similar to those in the Proposed Action, showed that noise levels at the reservation boundary would ordinarily not exceed the standards of the Oahu community noise rule (U.S. Army Engineering and Support Center, 2001).

3.13.5 SAFETY AND HEALTH—MAKUA MILITARY RESERVATION, OAHU

The Standard Operating Procedure for LFX at Makua Military Reservation (U.S. Army Garrison, Hawaii, 1998) addresses safety as its primary concern. The Standard Operating Procedure outlines assets, personnel, safety requirements, and procedures to be used during each LFX. Use of the range is scheduled through the Range Division—Hawaii Scheduling Office. Makua Range Control monitors all communications. (U.S. Army Garrison, Hawaii, 1998)

3.14 DILLINGHAM MILITARY RESERVATION, OAHU

RIMPAC activities at Dillingham Military Reservation include reconnaissance inserts and a helicopter raid, as described in chapter 2.0. The location for RIMPAC activities is shown in figure 2-9.

Dillingham Military Reservation is a 269-hectare (664-acre) training area with a beach and an airfield on the northwestern shore of Oahu (figure 2-9). It is on a narrow, sloping plain between the Waianae Range and the sea. The U.S. Army released 30 hectares (73 acres) of ceded land to the State of Hawaii per Section 2831 of the Fiscal Year 91 National Defense Authorization Act. This parcel included the west portion of the airfield at Dillingham Military Reservation, which is used by the state for general aviation during daylight hours only. Dillingham Military Reservation is also used by the U.S. Army for the following training activities: (1) small unit maneuvers of platoon- and squad-sized elements or combat support operations; (2) airmobile exercises and paradrop operations; and (3) helicopter night-vision goggle training, which requires the absence of bright man-made sources of light. (U.S. Army Garrison, Hawaii, 1996)

3.14.1 AIRSPACE—DILLINGHAM MILITARY RESERVATION, OAHU

Dillingham Military Reservation is used for helicopter and fixed wing aviation exercises and ground troop training exercises. The airfield is used by the State of Hawaii through a joint use agreement for general aviation, including sailplanes and parachute jumps, during daylight hours. Military operations generally occur at night. The single runway at Dillingham Military Reservation is 1,372 meters (4,500 feet) long and 91 meters (300 feet) wide. The total paved area is 2,743 meters (9,000 feet) long, including overruns and clear zones.

3.14.2 BIOLOGICAL RESOURCES—DILLINGHAM MILITARY RESERVATION, OAHU

Dillingham Military Reservation contains native natural communities that are considered rare and globally imperiled. The area is composed primarily of stands of native forest and shrubland vegetation on the cliffs and talus slopes. Ecological surveys have identified eight rare plants associated with the cliff ecological zone, including four with endangered status (appendix B, table B-7). (U.S. Army Garrison, Hawaii, and U.S. Army Corps of Engineers, 1998a)

3.14.3 CULTURAL RESOURCES—DILLINGHAM MILITARY RESERVATION, OAHU

The Ecosystem Management Plan Report (U.S. Army Garrison, Hawaii, and U.S. Army Corps of Engineers, 1998a) identified an extensive complex of agricultural and occupation features in the rocky sloping area between the airfield and the cliffs. In addition, pre- and post-contact features have been identified including platforms, boulder alignments, stone piles, walls, a ditch, and concrete foundations. There are three *heiau* temples also located within the Dillingham Military Reservation—two fishing shrines and “hidden waters” associated with Hawaiian legend. (U.S. Army Garrison, Hawaii, and U.S. Army Corps of Engineers, 1998a)

There are indications that there may have been pre-contact use of the coastal dune area for burial. Burial remains in sand deposits at Dillingham Military Reservation would be considered significant and eligible for inclusion in the NRHP as “properties of traditional religious and cultural importance.” (U.S. Army Garrison, Hawaii, and U.S. Army Corps of Engineers, 1998a)

There are also several World War II era buildings on the reservation that have not been inventoried. (U.S. Army Garrison, Hawaii, and U.S. Army Corps of Engineers, 1998a)

3.15 WHEELER ARMY AIRFIELD, OAHU

Wheeler Army Airfield is a former Air Force Base that was returned to the Department of the Army in 1991. It consists of approximately 562 hectares (1,389 acres) of land adjacent to Schofield Barracks. Wheeler Army Airfield is home to a variety of DoD activities including the Defense Communications Agency, the Air Force’s 6010th Aerospace Defense Group, the Hawaii Army National Guard’s Aviation Support Facility, and the 25th Infantry Division (Light) Aviation Brigade. (Inn at Schofield Barracks, 2002)

Soldiers from Schofield Barracks began clearing an area to make a landing strip in February 1922. The airfield was named in honor of Major Sheldon H. Wheeler on 11 November 1922. Wheeler Field became a separate permanent military post on 31 August 1939. (Inn at Schofield Barracks, 2002)

In August 1987, the Secretary of the Interior designated Wheeler Air Force Base, now Wheeler Army Airfield, a National Historic Landmark, recognizing it as a site of national

significance in the history of the United States and in particular, World War II in the Pacific (Inn at Schofield Barracks, 2002).

3.15.1 BIOLOGICAL RESOURCES—WHEELER ARMY AIRFIELD

No biological resource issues have been identified for Wheeler Army Airfield.

3.16 K-PIER, KAWAIHAE, HAWAII

RIMPAC activities at K-Pier primarily consist of offloading and loading vehicles and equipment from a landing ship at an existing boat ramp and possibly supporting HA/DR exercises as described in chapter 2.0. The beach area adjacent to the pier would be used for AAV landings and LCU operations (figure 2-10).

K-Pier is located within the Kawaihae Harbor, a commercial harbor located on the north west coast of the island of Hawaii. Kawaihae Harbor is a deep-water port, one of two on the island of Hawaii (University of Hawaii, Department of Geography, 1983). The harbor handled 406,000 metric tons (447,000 tons) of cargo in 1996. K-Pier is leased by the U.S. Army and is regularly used for similar operations.

3.16.1 BIOLOGICAL RESOURCES—K-PIER KAWAIHAE, HAWAII

No threatened or endangered species have been identified in the Kawaihae Harbor. EFH areas of particular concern have not been identified within the Kawaihae Harbor. A small beach area containing no vegetation is located immediately adjacent to K-Pier.

3.16.2 LAND USE—K-PIER KAWAIHAE, HAWAII

The Harbor Master controls access to K-Pier by locking two gated entrances. These are opened between 6:00 a.m. and 8:00 p.m., 7 days a week. The U.S. Army's loading area and fenced military reservation is inside this controlled area and is accessed from the northern gate. Also inside this area is the Pua Ka'ilima Okawaihae Cultural Surf Park established in 1998. The park is located adjacent and south of the loading area. This park is utilized as access to adjacent diving and surfing areas, and is open to the public during normal hours. Under normal conditions, it can be accessed through either gate. When large volumes of vehicles are being off loaded or back loaded, access to the park on the north side can be blocked. Access to the park is available from the other gate to the south.

3.17 BRADSHAW ARMY AIRFIELD, HAWAII

RIMPAC activities at Bradshaw Army Airfield include C2, AIROPS and reconnaissance inserts and helicopter raid, as described in chapter 2.0. The location for RIMPAC activities is shown in figure 2-6.

Bradshaw Army Airfield is located on the northern boundary of the Pohakuloa Training Area on the island of Hawaii and supports maneuver training. It has a 1,128-meter (3,700-foot) airstrip and a small cantonment area. There is a proposal to extend the airfield in order to provide adequate length for C-130 aircraft operations.

3.17.1 AIRSPACE—BRADSHAW ARMY AIRFIELD, HAWAII

When FAA Restricted Airspace R-3103 is active, Bradshaw Army Airfield Tower maintains control of a corridor of airspace for aircraft arriving or departing Bradshaw Army Airfield. Aircraft operating outside this corridor must coordinate with Range Control to enter or exit the airspace and to obtain specific routes for flights within Restricted Airspace R-3103 (U.S. Army Garrison, Hawaii, 1996). Commercial aviation routes are approximately 25 kilometers (16 miles) from Bradshaw Army Airfield (figure 3-3).

3.17.2 BIOLOGICAL RESOURCES—BRADSHAW ARMY AIRFIELD, HAWAII

Bradshaw Army Airfield is located in the north-northeastern portion of the Pohakuloa Training Area. The majority of the training area is vegetated with native plants, collectively identified as Subalpine dryland. Appendix B, tables B-8 and B-9 provide a detailed listing of the sensitive vegetation and wildlife at Pohakuloa Training Area which includes Bradshaw Army Airfield. (U.S. Army Garrison, Hawaii, and U.S. Army Corps of Engineers, 1998b)

Critical habitat for the endangered Palila bird has been identified both north and southeast of Bradshaw Army Airfield. However, no critical habitats have been identified in the immediate vicinity of the airfield itself. (U.S. Army Garrison, Hawaii, and U.S. Army Corps of Engineers, 1998b)

3.17.3 CULTURAL RESOURCES—BRADSHAW ARMY AIRFIELD, HAWAII

Most of the known sites are located in the western area of the Pohakuloa Training Area, away from Bradshaw Army Airfield. There are two separate archaeological management areas located east of the airfield one on each side of Saddle Road. No archaeological management areas have been identified on the airfield itself. (U.S. Army Garrison, Hawaii, and U.S. Army Corps of Engineers, 1998b)

3.18 POHAKULOA TRAINING AREA, HAWAII

RIMPAC exercises at Pohakuloa Training Area include ASMEX, CASEX, and LFX activities as described in chapter 2.0. The location for RIMPAC activities is the impact area shown in figure 2-6.

Pohakuloa Training Area is a sub-installation of Schofield Barracks (U.S. Pacific Command, 1995b). It is located near the center of the island of Hawaii in the Humuula Saddle between three volcanoes: Mauna Kea, Mauna Loa, and Hualalai. The training area is located on a roughly hexagonal tract of land that extends 24 kilometers (15 miles) from north to south and 27 kilometers (17 miles) from east to west. Its total area is approximately 44,031 hectares (108,800 acres) (U.S. Army Garrison, Hawaii, and U.S. Army Corps of Engineers, 1997b).

The mission of Pohakuloa Training Area is to provide training of full-scale live firing exercises for the 25th Infantry Division (Light), U.S. Army Garrison, Hawaii. Pohakuloa Training Area also provides training facilities for other branches of the U.S. military and friendly foreign forces. As a designated major training area, the training area provides a regional location where units from local training areas in the Pacific Rim can build on their home-station training. Training units of up to 2,500 personnel are assigned, usually for a 3- or 4-week rotation. It accommodates combined air/ground live-fire exercises not possible anywhere else in Hawaii. (U.S. Pacific Command, 1995b)

3.18.1 AIRSPACE—POHAKULOA TRAINING AREA, HAWAII

A description of existing airspace at Pohakuloa Training Area is provided in section 3.9.1 (Bradshaw Army Airfield).

3.18.2 BIOLOGICAL RESOURCES—POHAKULOA TRAINING AREA, HAWAII

Pohakuloa Training Area was surveyed for a biological resource baseline in 1997. Ten distinct habitats were identified, five of which are considered rare by the Hawaii Natural Heritage Program. The area has been disturbed by an influx of alien weedy vegetation and feral animals, particularly ungulates such as goats and sheep. A unique cave system harbors many wildlife species that may be endemic or completely new species.

The majority of the training area is vegetated with native plants, collectively identified as Subalpine dryland. Many native forest bird and plant species in the area are rare or endangered. Many of the species occurring at Pohakuloa Training Area are unique to the Island of Hawaii; several exist only in the Saddle Region surrounding Pohakuloa Training Area, while others are specific to the Pohakuloa Training Area itself. (U.S. Army Garrison, Hawaii, and U.S. Army Corps of Engineers, 1998b)

A total of 21 individual rare plant species with federal status have been identified, 13 of which are federally listed. Five of the 12 are considered critically endangered and two of these are known to exist only at the Pohakuloa Training Area. Eight rare animal species

have also been identified, including six listed endangered birds, the endangered Hawaiian hoary bat, and a rare land snail considered a species of concern.

Despite habitat damage caused by introduced species, Pohakuloa Training Area supports extensive populations of native and rare vegetation. Plant species found in the area that are federally listed as threatened or endangered are provided in appendix B, table B-8.

Many of the most abundant bird species are native to the Hawaiian Islands, such as the common 'amakihi (*Hemignathus virens*), 'I'iwi (*Vestiaria coccinea*), and 'apapane (*Himatione sanguinae*). Wildlife species federally listed as threatened, endangered, or of special concern are provided in appendix B, table B-9.

The impact area is in an isolated area in the center of the Pohakuloa Training Area. Detailed biological surveys and inventories of the impact area have not been conducted due to the hazard posed by unexploded ordnance. Helicopter fly-overs have been conducted and have identified several native taxa and natural areas within the impact area. (U.S. Army Garrison, Hawaii, and U.S. Army Corps of Engineers, 1997b)

3.18.3 CULTURAL RESOURCES—POHAKULOA TRAINING AREA, HAWAII

Recent archaeological surveys have identified 250 known archaeological sites at Pohakuloa Training Area. The majority are subterranean lava tubes, which are concentrated in the western portion of the training area. Other identified sites include a habitation cave, platforms and shrines, ahus (rock pile sites), trails, lithic quarries and workshops, rock walls, and an open-air shelter. Almost all of the 250 sites are related to traditional native Hawaiian history and would be considered significant under the National Historic Preservation Act (Criterion D) due to research potential. Protective measures for cultural resources have been addressed in the *Ecosystem Management Plan Report for Pohakuloa Training Area* (U.S. Army Garrison, Hawaii, and U.S. Army Corps of Engineers, 1998b)

As of 2001, an estimated 30 percent of the Pohakuloa Training area had been surveyed for archaeological sites. The current archaeological management areas are known sites. No archaeological sites have been identified within the impact area. There are two known caves west of Redleg Trail within the impact area. (U.S. Army Garrison, Hawaii, and U.S. Army Corps of Engineers, 1998b)

3.18.4 NOISE—POHAKULOA TRAINING AREA, HAWAII

The U.S. Army has adopted the National Sound Abatement Program, "I Fly Neighborly." This program sets flight patterns over national park lands and other noise-sensitive areas at 610 meters (2,000 feet) above ground level. Due to multiple state/national park lands and commercial/residential development on the Island of Hawaii, the 610-meter (2,000-foot) above ground level is maintained by all aircraft on approaches to and departures from Bradshaw Army Airfield (U.S. Army Garrison, Hawaii, 1996).

3.18.5 SAFETY AND HEALTH—POHAKULOA TRAINING AREA, HAWAII

The impact area is in an isolated area in the center of Pohakuloa Training Area with restricted access located away from the civilian population (figure 2-6). Safety and health precautions are covered in *Pohakuloa Training Area* External Standing Operating Procedures and are briefed by the Pohakuloa Training Area Operations Center (U.S. Army Garrison, Hawaii, 1996).

3.18.6 WATER RESOURCES—POHAKULOA TRAINING AREA, HAWAII

The structure associated with gently sloping basaltic extrusive lava flows results in many voids, shrinkage joints, and fractures. These rocks are porous and highly permeable. Natural discharges from upper elevations result in springs.

Except for some intermittent ponds in the extreme northeast corner of the reservation, there are no bodies of surface water in the Pohakuloa Training Area. Several springs along the slope of Mauna Kea north of the cantonment area provide a limited source of potable water for the installation. (U.S. Pacific Command, 1995b)

3.19 OCEAN AREA (OUTSIDE U.S. TERRITORY), HAWAIIAN ISLANDS

Ongoing RIMPAC activities in the open-ocean area include AAMEX, SSMEEX, ASWEX, ASMEEX, DEMO, SAMEX, GUNNEX, SINKEX, and SUBOPS, as described in chapter 2.0. The region of influence for RIMPAC activities includes the PMRF and Oahu Warning Areas (figure 2-2) and the submarine operation areas (figure 2-12). In addition, the SURTASS is a passive monitoring activity that is sometimes used in conjunction with SUBOPS and ASWEX.

Open ocean areas are subject to EO 12114. As discussed in the PMRF Enhanced Capability EIS (Pacific Missile Range Facility, Barking Sands, 1998), a limited number of resources would potentially be impacted, including airspace, biological resources, safety and health, and water resources.

3.19.1 AIRSPACE—OCEAN AREA, HAWAIIAN ISLANDS

The airspace outside territorial waters is in international airspace. As such, the procedures of the International Civil Aviation Organization (ICAO), outlined in ICAO Document 444, *Rules of the Air and Air Traffic Services*, are followed. ICAO Document 444 is the equivalent air traffic control manual to FAA Handbook 7110.65, *Air Traffic Control*. The FAA acts as the U.S. agent for aeronautical information to the ICAO, and air traffic is managed by the Honolulu Air Route Traffic Control Center (ARTCC) and the Oakland ARTCC. (Pacific Missile Range Facility, Barking Sands, 1998)

High and low altitude jet routes are shown in figure 3-3. These routes are managed by the Honolulu ARTCC and the Oakland ARTCC. However, pilots are increasingly allowed to file

individual, more direct flight plans under the Free Flight program (Pacific Missile Range Facility, Barking Sands, 1998).

3.19.2 BIOLOGICAL RESOURCES—OCEAN AREA, HAWAIIAN ISLANDS

Nine marine wildlife species listed as federal and state threatened or endangered species occur in the area, including the Hawaiian monk seal, blue whale, fin whale, humpback whale, sei whale, sperm whale, hawksbill turtle, green sea turtle, and loggerhead sea turtle (appendix B, table B-11). A comprehensive description of marine biology resources, including a section on migratory birds common to Hawaiian waters can be found in appendix E.

A variety of other whales and dolphins are found around the Hawaiian Islands, including the Minke whale (*Balaenoptera acutorostrata*) and Bryde's whale (*Balaenoptera edeni*). These whales have been identified both by visual sighting and by acoustic surveys. More than 20 species of toothed whales and dolphins are known to exist around the islands, including those most frequently seen: spinner dolphin, spotted dolphin, bottlenose dolphin, short finned pilot whale, false killer whale, and sperm whale. The spinner dolphin is commonly seen on the leeward side of all of the main Hawaiian Islands. Spotted dolphins are usually located near the spinners in deeper waters, while the bottlenose dolphins frequent both shallow and deep areas.

Pilot and false killer whales are frequently seen by fishermen and are generally found in groups or pods. (Pacific Missile Range Facility, Barking Sands, 1998) EFH areas of particular concern have not been mapped within the affected environment ocean areas.

3.19.3 SAFETY AND HEALTH—OCEAN AREA, HAWAIIAN ISLANDS

Training exercises within the Hawaiian Fleet Operating Areas are conducted in accordance with FACSFACPH Instruction 3120.1D. PMRF and FACSFACPH maintain surveillance and coordinate scheduling of the Hawaiian Fleet Operating Areas to ensure maximum utilization, coordination, and safety. As shown in figure 2-6, PMRF is the using agency for Warning Areas W-186, and W-188 and Restricted Airspace R-3101, and FACSFACPH is the using agency for Warning Areas W-187, W-189, W-190, W-191, W-192, W-193, W-194, and W-196 and Restricted Area R-3107. The easternmost section of Warning Area W-188 (Rainbow) has been subdelegated from PMRF to FACSFACPH. Scheduling responsibilities for the air and surface space has been divided between PMRF and FACSFACPH as listed above for the using agency.

In addition, all submarine activities are scheduled by Commander, Submarine Force Pacific and coordinated through FACSFACPH. For special operations, multi-participant, or hazardous weekend firings, PMRF and FACSFACPH publish dedicated warning NOTAMs and NOTMARs.

Operating Procedure 3120, FACSFACPH, includes a description of each operating area within the Hawaiian Fleet Operating Area. The description includes the location,

description, type of exercises, authorized ordnance, altitude, periods of usage, scheduling authority, communications frequencies, and special instructions including protected species considerations and restrictions. All activities must be in compliance with DoD Directive 4540.1 and OPNAVINST 3770.4A, which specify procedures for conducting aircraft operations and for missile/projectile firing. (Pacific Missile Range Facility, Barking Sands, 1998)

3.19.4 WATER RESOURCES—OCEAN AREA, HAWAIIAN ISLANDS

Water quality in the open ocean is excellent, with high water clarity, low concentrations of suspended matter, dissolved oxygen concentrations at or near saturation, and low concentrations of contaminants such as trace metals and hydrocarbons. (Pacific Missile Range Facility, Barking Sands, 1998)

3.20 KEEHI LAGOON, OAHU

Keehi Lagoon is located on Oahu's southern shore, encompassing a triangular shaped area between the Honolulu International Airport and Honolulu Harbor. Keehi Lagoon represents a historically active maritime area, changed over the passage of time into an almost completely artificial land and seascape.

3.20.1 BIOLOGICAL RESOURCES—KEEHI LAGOON, OAHU

The endangered Hawaiian black-necked stilt (*Himantopus mexicanus knudseni*) is known to occur in intertidal mudflats in the Keehi Lagoon. Wastewater treatment outfall releases into Keehi Lagoon.

3.20.2 SOCIOECONOMICS—KEEHI LAGOON, OAHU

Keehi Lagoon has historically been used as a harbor and anchorage area for ships and seaplanes. The lagoon has been dredged to create seaplane runways and fill for construction of the Honolulu Airport. The lagoon was also used extensively for fish farming. Currently, the lagoon is still utilized by boating traffic, small seaplanes, and recreational interests (University of Hawaii, 2002).

4.0

ENVIRONMENTAL CONSEQUENCES

4.0 ENVIRONMENTAL CONSEQUENCES

This chapter describes the potential environmental consequences of the Proposed Action (section 4.1) and No-action Alternative (section 4.2) by comparing the activities for each alternative with the potentially affected environmental components. The amount of detail presented in each section is proportional to the potential for impacts. Sections 4.3 through 4.6 provide discussions of the following with regard to proposed RIMPAC activities: cumulative impacts; mitigation measures; adverse environmental effects that cannot be avoided; consistency with federal, state, and local land-use plans, policies, and controls; energy requirements and conservation potential; irreversible or irretrievable commitment of resources; relationship between short-term uses of the human environment and the maintenance and enhancement of long-term productivity; and natural or depletable resource requirements and conservation potential.

To assess the potential for and significance of environmental impacts from the ongoing exercises proposed for RIMPAC, a list of activities necessary to accomplish the Proposed Action was first developed (chapter 2.0). Next, the environmental setting was described, with emphasis on any special environmental sensitivities (chapter 3.0). The Proposed Action was then compared with the potentially affected environmental components to determine the environmental impacts. Proposed RIMPAC activities were also reviewed against existing environmental documentation on current and planned actions and information on anticipated future projects at each of the sites to determine the potential for cumulative impacts.

4.1 PROPOSED ACTION

The exercises and locations proposed for RIMPAC are shown in table 2-3. The exercises would be conducted as described in chapter 2.0 at the locations described in chapter 3.0. RIMPAC may incorporate the use of an airship to support selected nearshore subsurface and range clearance activities. This aircraft platform is new to the exercise and would be assembled at Pearl Harbor and possibly used at any of several locations including Pearl Harbor (Ford Island), Coast Guard Air Station Barbers Point (or flightline hanger area) and/or PMRF. As such, the airships are the only aircraft support operations analyzed in the EA.

The C2 for RIMPAC consists of established communication links and protocols which connect the command operations with the participating installations, ranges, aircraft, ships and shore personnel. Generally, RIMPAC overall command is directed from the USS Coronado; however, for RIMPAC 02, overall C2 will be administered from a land-based command center at Pearl Harbor. Since C2 is an integral part of an established system and operates under strict operational guidelines and poses no apparent impacts to the environment, it is not addressed further in this document. However, C2 is shown for the various locations where major C2 activities would occur.

4.1.1 PACIFIC MISSILE RANGE FACILITY (PORT ALLEN, MAKAHA RIDGE), KAUAI

RIMPAC activities conducted at PMRF include C2, AIROPS, SAMEX, AAMEX, SSMEEX, SMWEX, CASEX, SPECWAROPS, DEMO, and AMPHIBEX as described in chapter 2.0. The region of influence for RIMPAC activities is shown in figure 3-1.

Launches of target missiles and drones from PMRF occur near the northern end of the installation at the existing ground-based target launch sites at PMRF launch complex and KTF. The targets would support AAMEX, SAMEX, and SSMEEX. The missile exercises would be conducted over PMRF Warning Areas W-188 (and also the Oahu Warning Area for SAMEX).

AIROPS would involve rotary and fixed wing aircraft and an airship. The airship would be deployed from the north end of the PMRF flight line, near the helicopters, in order to support and monitor several RIMPAC exercises including range clearance, mine detection in shallow water, and ASW to find submarines. The airship would require a temporary mooring consisting of a 15- to 18-meter (50- to 60-foot) high mast, with truss support and guy wires, anchored by temporary stakes and jersey barriers. The airship would operate within the restricted airspace of PMRF (R-3101). AMPHIBEX would also be conducted in the Majors Bay area as well as adjacent beach and inland areas.

DEMO exercises would be conducted in a roughly 14-square-kilometer (4-square-nautical-mile) square section of ocean that lies roughly adjacent to Majors Bay (figure 3-1). The exercise boundary encompasses portions of the PMRF Shallow Water Training Range, the Kingfisher Underwater Range, and open ocean. The entire area can be restricted to public access during training operations.

SMWEX would be conducted at the existing Surface Ship Sonar Object Training Area located off shore from PMRF (figure 2-3). The training area consists of buoys that are moored to the bottom by a wire rope. Maximum water depth in the training area is approximately 110 meters (360 feet).

4.1.1.1 Air Quality—Pacific Missile Range Facility, Kauai—SAMEX, AAMEX, SSMEEX

The main air emission source from SAMEX, AAMEX, and SSMEEX would be associated with the launch of target missiles or drone aircraft. A typical target launch motor is the Talos. The sustainer is a ramjet engine. The *ZEST Flight Test Experiments Environmental Assessment, Kauai Test Facility, Hawaii* (Strategic Defense Initiative Organization, 1991) analyzed the potential air quality impacts for both nominal launches and mishaps of a missile system which used the Talos motor. This analysis included computer screening using the PUFF model. For nominal launch conditions, this analysis indicated no potential for exceeding applicable short-term guideline concentrations. Due to the altitude at which it operates and the mobile nature of the emitter, the ramjet is not expected to impact ambient air quality. No air quality impacts are anticipated due to the continued use of the ground hazard area for launches. Additional screening using the TSCREEN PUFF model indicates there would also be no potential for exceedance of either the National Ambient

Air Quality Standards or health-based guidance levels in the event of a near-launch pad mishap involving the combustion of the entire launch motor (Pacific Missile Range Facility, Barking Sands, 1998). The launch of the air-to-air, air-to-surface, and surface-to-air missiles would occur over the open water and would not affect local air quality.

4.1.1.2 Airspace—Pacific Missile Range Facility (Port Allen, Makaha Ridge), Kauai—C2, AIROPS, SAMEX, AAMEX, CASEX, SPECWAROPS, DEMO, AMPHIBEX

Air activity is coordinated by PMRF Range Control. For operations including 10 or more aircraft, the PMRF manager submits a NOTAM to the affected Flight Service Station and includes this information to the airfield Air Traffic Information Service (U.S. Army Garrison, Hawaii, 1996).

Amphibious landings, simulated boat raid activities, and special operations entail no use of controlled airspace other than localized use of rotary wing craft and jet aircraft in support of amphibious landing exercises within predefined areas. DEMO exercises would require localized use of helicopters to transport divers and sweep for marine mammals. No impact to airspace has been identified at PMRF, Makaha Ridge, or Port Allen. The ongoing PMRF exercises, including RIMPAC activities, would continue to utilize the existing airspace and follow FAA flight rules. No new special use airspace proposal or any modification to the existing special use airspace is contemplated to accommodate activities. Consequently, no impacts to the airspace at PMRF would result from RIMPAC activities (Pacific Missile Range Facility, Barking Sands, 1998). The airship would also operate within existing restricted airspace during RIMPAC exercises but would follow FAA commercial flight rules when mobilizing/demobilizing from PMRF to Pearl Harbor.

4.1.1.3 Biological Resources—Pacific Missile Range Facility (Port Allen, Makaha Ridge), Kauai—AIROPS, SAMEX, AAMEX, SSMEX, SMWEX, SPECWAROPS, DEMO, AMPHIBEX

Potential impacts of past amphibious landings have been monitored. Observations indicate that due to procedures in place at PMRF and the continuing disturbance of the beach and over-night area from past public and military use, the impact from AMPHIBEX activities would be insignificant. Within 1 hour of initiation of the AMPHIBEX landing activities, landing routes and beach areas would be determined to be clear of marine mammals and sea turtles. If any are seen, the exercise would be delayed until the animals leave the area.

DEMO activities in the near-shore environment include destruction of inert mines by detonation of less than 9.1 kilograms (20 pounds) of explosive per inert mine. Prior to actual detonation, the area would be determined to be clear of marine mammals and turtles. The radius of the cleared area is the distance at which cetacea (whales and dolphins) are subjected to the minimum measurable shift in their auditory threshold, called the onset of temporary threshold shift (onset-TTS). Sea turtles, being less sensitive, are presumed safe at this distance. The onset-TTS distance is determined in accordance with the criterion and propagation-modeling methods, REFMS, that were established from explosive impulse in shock trial of *USS Winston S. Churchill* (U.S. Department of the Navy, 2001b). That is, the more conservative (greater) distance associated with the receive level

of either 83 kilopascals (12 pounds per square inch) peak-pressure or 182 decibels micro-pascal squared seconds (total energy) in any 1/3 octave band above 10 hertz. These distances have been estimated using the REFMS shock-wave propagation model for charge weights of 0.9, 2.3, and 9.1 kilograms (2, 5, and 20 pounds) with charge placement 0.3 meter (1 foot) above a reflective sandy bottom in 9.1 meters (30 feet) of water and using a conservative sound velocity profile (iso-velocity in this context). Table 4-1 shows the modeled distances for onset-TTS for the weights of 0.9, 2.3, and 9.1 kilograms (2, 5, and 20 pounds). Intermediate charge-weights were interpolated using a least-squares curve fit ($D = 318 + 734 CW^{0.333}$, where D is the distance in feet and CW is the charge weight) (Sigurdson, 2002).

Table 4-1: Marine Mammal Area Clearance Based on Charge Weight at 9.1 Meters (30 Feet) Water Depth

Charge Weight, in kilograms (pounds)	Modeled Distance in meters (feet)	Interpolated Distance in meters (feet)	Radius of Area To Be Cleared in meters (feet)*
0.9 (2)	373.4 (1,225) (p)	378.9 (1,243)	380 (1,250)
2.3 (5)	487.7 (1,600) (e)	479.5 (1,573)	490 (1,600)
4.5 (10)		578.8 (1,899)	580 (1,900)
6.8 (15)		648.6 (2,128)	640 (2,100)
9.1 (20)	701 (2,300) (p)	704.1 (2,310)	700 (2,300)

*All numbers have been rounded for ease of understanding and application

p = determined by peak-pressure criterion; e = determined by total energy criterion

The estimated distances presented here are preliminary and are for the shallow waters off Hawaii in the planned initial exercises. They should not be applied in other contexts. The distances are intentionally conservative to compensate for various known factors that have not been exactly measured. Pending the outcome of research, such measures may become known and the values may be restated in the future. The stated distance from the specific charge size would be determined to be clear of all whales, seals, and turtles before proceeding with a detonation. Standard procedures at PMRF require tethered mines to be suspended at least 3 meters (10 feet) below the surface of the water. Explosive charges on or near the shallow water bottom would be placed in sandy bottom areas away from exposed reefs and coral. There would be a minor, localized, unavoidable loss to some fish and benthic community populations from the explosions. These shallow areas are not located in areas identified as EFH or HAPC, which occur at depths greater than 40 meters (120 feet). These steps serve to minimize the potential of detrimental impacts to biological resources. After exercises involving underwater detonations, the area would be searched for injured animals.

Special warfare operations at PMRF, including those out of Port Allen, would include reconnaissance and survey inserts (also at Makaha Ridge) and an underwater beach survey at Barking Sands. Existing cleared areas, trails, and roads would be utilized. Due to the non-intrusive nature of these activities, no impact to biological resources is anticipated.

Potential impacts of target missile launches on terrestrial and marine biological resources within the region have been addressed in detail in the Strategic Target System EIS (U.S. Army Strategic Defense Command, 1992). Based on the analyses done at that time and the effects of past target and missile launch activities, the potential impacts of target (SAMEX, AAMEX, and SSMEX) launching activities on biological resources are minimal (Pacific Missile Range Facility, Barking Sands, 1998).

Surface impacts of targets are expected to occur in offshore locations. The potential for an object or objects dropping from the air to affect marine mammals (whales or monk seals), sea turtles, or other marine biological resources is less than 10^{-6} (1 in a million) (U.S. Army Strategic Defense Command, 1992; Pacific Missile Range Facility, Barking Sands, 1998). Munitions, unrecovered targets, and sonobuoys would sink to the ocean floor.

Potential impacts resulting from SMWEX activities would result from a ship directly contacting a large marine mammal during the exercise. Given that the exercise will be conducted in a relatively shallow underwater range, approximately 46 to 107 meters (150 to 350 feet) deep, it is unlikely that large whales would be in waters that shallow, or that dolphins would be unable to avoid the relatively slow vessel. The RIMPAC OORDER annex for environmental protection outlines procedures for collision avoidance and encounter reporting. Therefore it is highly unlikely that marine mammals would be impacted during SMWEX exercises.

AIROPS would utilize existing runways and airspace. Moorings and associated stabilizing supports, guy wires, and anchors for the airships would be placed in existing open areas. The impacts of AIROPS on biological resources would be minor and insignificant.

4.1.1.4 Cultural Resources—Pacific Missile Range Facility, Kauai—SAMEX, AAMEX, SSMEX, SPECWAROPS, DEMO, AMPHIBEX,

Potential impacts from amphibious landings and DEMO exercises are not anticipated, as cultural resources have not been recorded from Majors Bay and associated beach landing and staging areas. The upland over-night area has an adjacent cultural site that is marked as a “Keep Out” area. This area would not be disturbed by the over-night activities.

Impacts to archaeological and historic resources from RIMPAC target launch activities (including mishaps, pressure damage [to buildings and structures], inadvertent ignition of vegetation and subsequent fire suppression activities, and increased human presence in archaeologically sensitive areas) are effectively avoided or minimized by current mitigation practices at PMRF (Pacific Missile Range Facility, Barking Sands, 1998). Through the implementation of the appropriate monitoring, consultations with SHPO Hawaii, and by following the U.S. Navy and PMRF’s Cultural Resources Management Plan, impacts to cultural resources at PMRF are not anticipated.

4.1.1.5 Geology and Soils—Pacific Missile Range Facility, Kauai—SAMEX, AAMEX, SSMEX, SPECWAROPS, DEMO, AMPHIBEX

Potential impacts from amphibious landings and DEMO exercises are expected to be short-term and minor. Although the beach sand and ocean floor would be disturbed, natural wave, littoral drift, wind, and gravity processes would restore the surfaces in short order. SPECWAROPS operations at Makaha Ridge would utilize existing trails and roads and result in no additional erosion potential.

Lead has been found in the soil in the immediate vicinity of the Vandal launch pad and the KTF launch area. Lead levels at both locations were determined not to represent a public or worker health and safety risk (Pacific Missile Range Facility, Barking Sands, 1998). RIMPAC launches would be within normal launch schedule. These activities would add only minor amounts of lead to the soils immediately surrounding the launch pad and, therefore, would not have a significant impact on geology and soils.

4.1.1.6 Hazardous Materials and Waste—Pacific Missile Range Facility, Kauai—AIROPS, SAMEX, AAMEX, SSMEX, AMPHIBEX

No adverse impacts are anticipated to result from hazardous materials used and hazardous waste generated during RIMPAC activities. PMRF activities have resulted in minimal impacts to the environment from the use of hazardous materials and the generation of hazardous waste. RIMPAC activities would use and generate similar amounts and types of hazardous materials and waste as other activities at PMRF. PMRF activities follow the appropriate state and federal requirements for the management of hazardous materials and hazardous waste. All hazardous materials and hazardous waste would continue to be shipped in accordance with Department of Transportation (DOT) regulations. (Pacific Missile Range Facility, Barking Sands, 1998) The RIMPAC OPODER, Annex L (Environmental Protection), which is provided as an example in appendix A, lists specific responsibilities regarding hazardous waste generated during RIMPAC.

The hazardous materials used and hazardous waste generated from solid and liquid propellant missiles during launch activities at PMRF, including any potential mishaps, have been previously analyzed and determined not to result in any significant impacts to the environment. (Pacific Missile Range Facility, Barking Sands, 1998; U.S. Army Strategic Defense Command, 1992)

4.1.1.7 Land Use—Pacific Missile Range Facility, Kauai—AIROPS, SAMEX, AAMEX, SSMEX, SPECWAROPS, AMPHIBEX

The amphibious landings and associated activities would be conducted in areas that have been determined to be compatible with such activities. In addition, mooring of an airship at PMRF would be compatible with existing land use.

RIMPAC target launch operations have safety areas that extend beyond the base boundary and would have the potential to impact land adjacent to PMRF. Use of this land requires activation of a restrictive easement. Land use impacts associated with use of the

restrictive easement have been previously addressed in the Restrictive Easement EIS that was approved by the State of Hawaii. (U.S. Army Space and Strategic Defense Command, 1993) The results of the analysis concluded there would be no impacts to land use on PMRF or adjacent to the installation. (Pacific Missile Range Facility, Barking Sands, 1998) PMRF target launching activities have been found to be consistent to the maximum extent practicable with the Hawaii Coastal Zone Management Program. (Pacific Missile Range Facility, Barking Sands, 1998)

Recreational opportunities on PMRF historically are provided to both the public and base personnel. PMRF has allowed access by the public to the beaches and water areas during times of non-hazardous operations. PMRF has severely restricted public access since September 2001 for security reasons. The potential for future public access to the installation's beaches and water areas, when not used during military operations, will continue to be evaluated. Impacts to recreational uses from RIMPAC activities are not expected because the beaches on PMRF only represent a small portion of the available resources on western Kauai and do not provide any unique recreational coastal opportunities that cannot be provided elsewhere on the island. In addition, to minimize potential recreational user conflicts, PMRF maintains a 24-hour hotline that is updated daily to inform the public as to which beaches and water areas would be closed.

The PMRF Enhanced Capability EIS addressed closures of portions of Polihale State Park (Pacific Missile Range Facility, Barking Sands, 1998). Unavoidable short-term effects would be associated with temporary closure of the southern portion of Polihale State Park during some missile launching activities at PMRF. However, the amount of closure time would not result in any long-term impacts to recreational activities or subsistence fishing uses.

4.1.1.8 Noise—Pacific Missile Range Facility, Kauai—AIROPS, SAMEX, AAMEX, SSMEX, SPECWAROPS, DEMO, AMPHIBEX

During an amphibious landing exercise, the total perceived noise would be the combination of ambient noise and noise from the exercises. Depending on the location, ambient noise sources may include noise from wind, surf, highway traffic, aircraft operations, and other local noise-generating land uses. Noise sources from the exercise may include helicopter, fixed wing aircraft, and airship operations, and operations of diesel engines of landing craft and tracked vehicles. Small arms fires, using blank ammunition during the beach assault, would produce minor, short-term increase in ambient noise levels and cannot be avoided. At PMRF, military housing is 305 to 915 meters (1,000 to 3,000 feet) from the landing beach.

SPECWAROPS exercises would utilize helicopters and vehicles and have a minor temporary impact on noise levels on Makaha Ridge.

Demolition activities would generate noise from the detonation of relatively small charges (less than 9.1 kilograms [20 pounds]) of explosive. The noise would be mitigated by placing the charges on the ocean bottom. Clearance zones would be employed.

Aerial targets would be launched from the northern end of PMRF. Potential launch-related noise issues consist of worker related and community annoyance. Limits have been set by both DoD and Occupational Safety and Health Administration to prevent damage to human hearing. Generally, noise exposure should not exceed 140 dBA at any time. A time-weighted limit for a 15-minute (or less) exposure is 115 dBA. In areas where these noise levels would be exceeded, personnel are required to wear hearing protection to bring exposure levels down to safe levels. Launch of the aerial targets at PMRF has been previously analyzed and determined not to have a significant impact on PMRF personnel or the surrounding region. (Pacific Missile Range Facility, Barking Sands, 1998; U.S. Army Strategic Defense Command, 1992)

4.1.1.9 Safety and Health—Pacific Missile Range Facility, Kauai—AIROPS, SAMEX, AAMEX, SSMEX, SPECWAROPS, DEMO, AMPHIBEX

Standard operating procedures, as described in chapter 2.0, would be followed for AIROPS, AMPHIBEX, SPECWAROPS, and DEMO exercises. These procedures include the use of clearance zones to protect personnel; thus, adverse impacts are not anticipated.

Target launch activities at PMRF occur on the northern part of the base. Targets are launched from fixed or portable launchers using solid propellants. Aerial target launch activities are divided between pre-launch and launch. The following section provides an analysis of general launch scenarios conducted at PMRF.

Pre-launch Operations

Missiles and support equipment may arrive at Pearl Harbor before final shipment to PMRF. Equipment is available at Pearl Harbor for the loading and unloading of missiles, and storage areas are available for the temporary storage of hazardous materials. From Pearl Harbor, missiles and support equipment are shipped to PMRF by aircraft or by ship to Nawiliwili Harbor, then by DoD/DOT-approved over-the-road common carrier truck. The equipment is then placed in secure storage until assembly and launch preparation. Applicable safety regulations are followed in transporting and handling hazardous materials including those required by the State of Hawaii. Transportation accidents are unlikely on Kauai given the in-place safety procedures used by PMRF during transportation and handling. All transportation at PMRF on Kauai roads is conducted in accordance with DOT and Hawaii transportation regulations. PMRF establishes and maintains appropriate Explosive Safety Quantity-Distances (ESQDs) around facilities where ordnance is stored and handled. The ESQD is an area within which unauthorized personnel are not permitted during hazardous operations (Pacific Missile Range Facility, Barking Sands, 1998).

A pre-launch accident on the launcher or in the assembly building would be characterized by either an explosion and/or detonation of the missile propellants, or a situation in which the missile propellants burn without detonation or explosion. An ESQD surrounding the launcher is calculated based on the equivalent explosive force of all propellant and pyrotechnic materials contained on the flight vehicle. All potentially hazardous debris resulting from an accident on the launcher would be contained entirely within the ESQD, which would already have been cleared of unprotected personnel. Teams are available for

fire suppression, hazardous materials emergency response, and emergency medical response during launch operations. There is the potential that toxic fumes from the burning propellant could pose a health threat. However, modeling conducted for the Strategic Target System booster (the largest missile launched from PMRF) and the Talos booster (same motor as the U.S. Navy Vandal first stage) determined that an on-pad launch anomaly of either system would not endanger public health or safety in the PMRF area. (Pacific Missile Range Facility, Barking Sands, 1998; U.S. Army Strategic Defense Command, 1992)

Launch Operations

Safety and health hazards associated with launch operations can occur as a result of inhalation of exhaust products associated with normal operations; impact hazards associated with a launch anomaly (explosion, crash, flight termination); and inhalation hazards from an abnormal launch (fire, crash, flight termination). The primary method for preventing the adverse safety and health effects associated with these occurrences involves the physical isolation of the area immediately surrounding the launch site before launch. At no time are individuals of the public exposed to a probability of fatality greater than 1 in 10 million for any single mission and 1 in 1 million on an annual basis. This standard maximum risk to the public is less on an annual basis than the risks from accidents occurring in the home or in public. (Pacific Missile Range Facility, Barking Sands, 1998)

For a typical aerial target drone, the representative ground hazard area for launches extends to a radius of up to 366 meters (1,200 feet). The Range Safety Officer determines actual ground hazard area dimensions and safety procedures for each target or test missile flight.

In addition to the ground hazard area, a launch hazard area would be established on the overwater areas where any debris from a flight termination or missile stage could fall. The launch hazard area would be determined for each type of test, taking into account the same parameter as for the ground hazard area. As part of their routine operations before launch, PMRF would ensure the launch hazard area is verified clear of non-participating aircraft and vessels by establishing warning and restricted areas, publishing NOTAMs through the FAA, NOTMARs through the Coast Guard, and HYDROPACs, and by real-time coordination with agencies controlling both surface and air traffic. Area surveillance and clearance of the launch hazard area and determination that the stage impact areas are clear would be provided by PMRF aircraft and vessels. To further minimize the potential for launch-associated hazards, PMRF would have its Missile Accident Emergency Team assembled for all launches from KTF and on an on-call status for PMRF launches in accordance with PMRF Instruction 5100.1F.

As a result of a nominal (successful) launch, the only identified potential hazard is the inhalation of rocket motor exhaust products released during the first few seconds of the launch operation. Concentrations are expected to reach undetectable levels by the time the plume reaches the boundaries of the ground hazard area or launch hazard area, and thus people would not be exposed to concentrations exceeding the exposure limits.

Termination of flight shortly after liftoff would result in potentially hazardous debris being contained within the ground hazard area or launch hazard area where the public and non-essential personnel would be excluded. Personnel within the ground hazard area would be protected in bunkers or behind berms. Air emissions from the flight termination could pose a health threat. However, modeling conducted for the largest solid propellant target determined that all exhaust concentrations were below applicable health-based standards at each of the respective ground hazard area boundaries (Pacific Missile Range Facility, Barking Sands, 1998; U.S. Army Strategic Defense Command, 1992). Potentially hazardous debris, which would impact the ground on the island should a flight termination occur, could present a health and safety risk. The material would consist of metals, solid or liquid propellant, and batteries (such as nickel cadmium and potassium hydroxide). Much of the hazardous material would be consumed in the launch anomaly. After such a flight termination or launch anomaly, potentially hazardous debris would be recovered from the ground hazard area and disposed of in accordance with federal and state hazardous waste regulations. Termination of flight after the aerial target has left the launcher would occur over open water within the launch hazard area, which would be determined cleared of surface vessels and aircraft before launch. Because termination would occur over open water away from the public, it does not pose any public health risks.

4.1.1.10 Water Resources—Pacific Missile Range Facility, Kauai—SAMEX, AAMEX, SSMEX

Analysis of launch-related impacts is covered in the Final EIS for the Strategic Target System (Pacific Missile Range Facility, Barking Sands, 1998; U.S. Army Strategic Defense Command, 1992). The EIS evaluated the potential impacts of launch emissions, spills of toxic materials, and early flight termination. The analysis concluded that liquid fuel exhaust products (water vapor, nitrogen gas, and carbon monoxide) would have no impact on surface or groundwater. The analysis also considered solid fuel exhaust products and concluded that hydrogen chloride emissions would not significantly affect the chemical composition of surface or groundwater; that there would be no significant increase in aluminum oxide in surface waters due to launches; that sampling of surface waters in the vicinity of the launch site showed that hydrogen chloride, potentially deposited during past launches, has not affected surface water quality on PMRF or adjacent areas; that contamination from spills of toxic materials would be highly unlikely; and that no significant effects on marine or freshwater due to solid fuel debris are expected. An assessment of lead concentration and water quality in the nearshore marine environment was conducted in 1994. Lead oxide is one of the exhaust emissions from the Vandal missile. The results did not show an increase in lead concentrations above the U.S. Department of Health risk-based cleanup goal (Pacific Missile Range Facility, Barking Sands, 1998).

Discharge of wastewater from U.S. Navy vessels would be in accordance with 40 CFR 1700 and standard U.S. Navy guidelines that prohibit such discharges within 22 kilometers (12 nautical miles) of the shoreline. Foreign vessels are asked to comply. Impacts to beach and water areas from wastewater or tar balls have not been reported by PMRF personnel. (Schauer, 2002)

4.1.2 NIIHAU

4.1.2.1 Biological Resources—Niihau—SPECWAROPS

SPECWAROPS exercises on Niihau would utilize existing opening, trails and roads. Therefore, no impacts to biological resources would be anticipated.

4.1.2.2 Cultural Resources—Niihau—SPECWAROPS

No known traditional cultural properties are located within the U.S. Navy's Mobile Operations Area on Niihau. Personnel would take all measures to prevent discovery, including not overturning rocks or digging any soil. Helicopter lands would be in areas designated for suitability and absence of cultural resources. However, it is possible during SPECWAROPS exercises for participants to find a previously unknown site. Exercise participants would be briefed on the need to promptly notify U.S. Navy Region personnel if any cultural resources are found so the appropriate coordination could be initiated.

4.1.3 KAULA

4.1.3.1 Airspace—Kaula—STWEX, GUNNEX

The ongoing, continuing exercises, including RIMPAC activities, would continue to utilize the existing airspace (R-3107 and W-187). No new special use airspace proposal or any modification to the existing special use airspace is contemplated to accommodate continuing mission activities (Pacific Missile Range Facility, Barking Sands, 1998). Consequently, no impacts to the airspace over Kaula would result from RIMPAC activities.

4.1.3.2 Biological Resources—Kaula—STWEX, GUNNEX

Ongoing STWEX and GUNNEX activities at the southernmost 4 hectares (10 acres) of Kaula involve some inadvertent ordnance release in the nearshore areas. As the humpback whales have been known to frequent this area during the winter season, use of live ordnance is restricted between the months of December and April. Sonobuoys are sometimes used to detect the presence of whales near Kaula. Prior to each gunnery run, a dry run is made over Kaula to verify the area is clear. In addition, RIMPAC is not planned to occur during the whale season of November through April (appendix B, table B-11).

RIMPAC exercise would utilize non-explosive rounds on Kaula. Therefore, it is unlikely that individual migratory seabirds may be lost due to the use of inert munitions in the designated impact area. The impacts on the populations of these species would be expected to be minimal. (Pacific Missile Range Facility, Barking Sands, 1998)

4.1.3.3 Cultural Resources—Kaula—STWEX, GUNNEX

Six archaeological sites were observed outside of the impact area in 1999. Due to the absence of cultural resources sites identified within the impact area on Kaula, no cultural impacts have been identified.

4.1.3.4 Safety and Health—Kaula—STWEX, GUNNEX

To minimize health and safety risks, the U.S. Navy has established a Surface Danger Zone around Kaula and has closed the island and surrounding tidal zone to unauthorized personnel. No adverse impacts are anticipated.

4.1.3.5 Water Resources—Kaula—STWEX, GUNNEX

Due to the lack of surface water and groundwater resources on the island, no impacts have been identified.

4.1.4 PEARL HARBOR (FORD ISLAND, MDSU-1 FACILITY, SURROUNDING HARBOR), OAHU

4.1.4.1 Airspace—Pearl Harbor (Ford Island), Oahu—C2, AIROPS, SPECWAROPS

An airship may be deployed at Ford Island to support and monitor several RIMPAC exercises including range clearance, mine detection in shallow water, and ASWEX. The airship would be shipped to Pearl Harbor and assembled at Dry-dock 4 over a period of 2 months. The airship would require a temporary mooring consisting of a 16.1- to 19.4-meter (50- to 60-foot) high mast, with truss support and guy wires, anchored by temporary stakes and jersey barriers. The airship has two engines and operates under rules for powered flight. It is assumed that the RIMPAC exercises would require the airship to support range clearing and ASWEX activities throughout the area of responsibility. Therefore the airship would pass through both military restricted airspace and tower controlled and uncontrolled airspace. The airship would comply with all FAA regulations for flight execution. SPECWAROPS operations would utilize helicopters to reach objectives within Pearl Harbor. Thus, adverse impacts to Pearl Harbor airspace would not be anticipated.

4.1.4.2 Biological Resources—Pearl Harbor (Ford Island), Oahu—IN-PORT/SUPPORTEX, SPECWAROPS, SALVAGE OPS

RIMPAC exercises have procedures and practices in place to prevent the introduction of invasive species, EO 13112, to Pearl Harbor. The U.S. Navy would request that multinational participants purge bilge/ballasts tanks prior to entering U.S. Territorial Waters.

The potential that RIMPAC in-port, SPECWAROPS, and SALVAGE OPS activities could impact marine mammals (whales or monk seals) or sea turtles is very small. The movement and berthing of ships and small training exercises in the harbor area is a part of ongoing activities at Pearl Harbor. The RIMPAC OORDER annex for environmental protection outlines procedures for marine mammal collision avoidance and encounter reporting. Therefore, no impact to biological resources is anticipated.

4.1.4.3 Socioeconomics—Pearl Harbor (Ford Island), Oahu—IN-PORT/SUPPORT/EX

The potential socioeconomic impacts of in-port activities include the additional demands of the transient military population on public services within the local community and the positive impacts on the local economy of expenditure by the military and its personnel.

In-port activities have been accommodated by Pearl Harbor and the wider Oahu region regularly over the last 30 years. The Proposed Action would require approximately 8,000 to 30,000 personnel to attend in-port activities at Pearl Harbor at any time during the 18 days of briefings and exercises on island. Prior to the enhanced security procedures in place since September 2001, the number of personnel expected to be off-base at any one time is approximately two-thirds of those in port, or 5,300 to 20,000. Since access for foreign nationals into Pearl Harbor is unknown at this time, the potential impact resulting from increased traffic entering the base is also unknown. In addition, it is unknown what the impact of new security/access policies and procedures would have on the movements and accommodation of foreign nationals during the peak loading periods of the in-port exercise.

The sophisticated urban and tourist infrastructure of Oahu coupled with Pearl Harbor's depth of experience in accommodating transient military personnel would combine to minimize the impact of the Proposed Action on the social infrastructure of Oahu.

In 1998, there were 4,718,420 visitor arrivals on Oahu. The Proposed Action would generate a maximum of 30,000 arrivals, or the equivalent of one half of one percent of Oahu's 1998 visitor arrivals.

The Hawaii Convention Center opened in 1998. The *Final EIS for the Hawaii Convention Center* (Hawaii Convention Center Authority, 1995) forecasted 36 events in 1998, growing to 52 by 2003. The average number of delegates and guests per event was forecasted to grow from 7,100 to 10,500 over the same period. The Proposed Action, with a single event loading of 20,000 personnel, would almost double a convention scale program.

Expenditures by transient military personnel and the purchase of goods and services to support the in-port program would have a positive direct effect on the local economy. The nature of this impact is illustrated by comparing the possible direct expenditure of military personnel taking part in in-port activities with gross visitor-related expenditures. The 18 days of in-port activities would result in approximately 300,000 person days. Assuming two-thirds engage off-base each day, and each spends \$100 per day, a total of \$19.8 million of direct income would be generated. This would represent approximately 0.19 percent of total gross visitor related expenditure in Hawaii in 1997.

4.1.5 IROQUOIS LAND/UNDERWATER RANGE, OAHU

4.1.5.1 Biological Resources—Iroquois Land/Underwater Range, Oahu—SPECWAROPS, DEMO

DEMO and SPECWAROPS activities in a harbor environment may include destruction of inert mines by detonation of less than 9.1 kilograms (20 pounds) of explosive per inert mine. Prior to actual detonation, the area would be determined to be clear of marine mammals (see 4.1.1.3). Standard procedures require tethered mines to be suspended at least 3 meters (10 feet) below the surface of the water. Explosive charges on or near the shallow water bottom would be placed in sandy areas away from exposed reefs and coral. There would be a minor, localized, unavoidable loss to some fish and benthic community populations from the explosions. These shallow areas are not located in areas identified as EFH or HAPC, which occur at depths greater than 40 meters (120 feet). After exercises involving underwater detonations, the area would be searched for injured animals. The care taken to assure a clear area of operation prior to detonation (see 4.1.1.3), the procedures implemented in charge placement, and the infrequent occurrence of these detonations all lead to a minimal impact on biological resources in the area.

4.1.6 PU'ULOA UNDERWATER RANGE, OAHU

4.1.6.1 Biological Resources—Pu'uloa Underwater Range, Oahu—SPECWAROPS, DEMO, SALVAGE OPS

DEMO activities in the nearshore environment include destruction of inert mines by detonation of less than 9.1 kilograms (20 pounds) of explosive per inert mine. Prior to actual detonation, the area would be determined to be clear of marine mammals (see 4.1.1.3). Standard procedures require tethered mines to be suspended at least 3 meters (10 feet) below the surface of the water. Explosive charges on or near the shallow water bottom would be placed in sandy areas away from exposed reefs and coral. Small cutting charges may be utilized during SALVAGE OPS training on existing underwater wrecks. There would be a minor, localized, unavoidable loss to some fish and benthic community populations from the explosions. These shallow areas are not located in areas identified as EFH or HAPC, which occur at depths greater than 40 meters (120 feet). After exercises involving underwater detonations, the area would be searched for injured animals. The care taken to assure a clear area of operation prior to detonation (see 4.1.1.3), the procedures implemented in charge placement, and the infrequent occurrence of these detonations all lead to a minimal impact on biological resources in the area.

SPECWAROPS and SALVAGE OPS may be performed in conjunction with DEMO and ship fire exercises. These activities are non-intrusive in nature and would not have a significant impact on biological resources.

4.1.6.2 Land Use—Pu'uloa Underwater Range, Oahu—DEMO

Use of the range for DEMO activities should not result in closure of Ewa Beach for recreational activities by the public since Ewa Beach is located outside the safety clearance zone.

Aquaculture farming would not be impacted by DEMO activities at the range. The explosives that would be used to destruct the inert mines would be less than 9.1 kilograms (20 pounds) of explosive per mine. Any effects from noise, shock, or residual chemicals from the detonation would be localized and temporary. In addition, the aquaculture farm is more than 0.9 kilometer (0.5 nautical mile) from the range boundary. There would be no environmental impact to the aquaculture farm due to the dampening and diluting effect of the ocean and currents over that distance.

4.1.6.3 Safety and Health—Pu‘uloa Underwater Range, Oahu—SPECWAROPS, DEMO, SALVAGE OPS

Inert dummy mines are used in the exercises. The total net explosive weight used against each inert mine ranges from less than 0.5 kilogram to 9 kilograms (about 1 pound to 20 pounds).

All SPECWAROPS, DEMO, and SALVAGE OPS activities are conducted in accordance with COMNAVSURFPAC Instructions. Prior to any explosive being detonated, divers are transported a safe distance away and a thorough search is made of the area to ensure the absence of unauthorized boats and aircraft. The range is located well offshore and the activities would not impact utilization of public beaches; therefore, no impacts to safety and health from RIMPAC activities are anticipated.

4.1.7 BARBERS POINT UNDERWATER RANGE, OAHU

4.1.7.1 Biological Resources—Barbers Point Underwater Range, Oahu—SPECWAROPS, DEMO

DEMO and SPECWAROPS activities in the nearshore environment include destruction of inert mines by detonation of less than 9.1 kilograms (20 pounds) of explosive per inert mine. Prior to actual detonation, the area would be determined to be clear of marine mammals (see 4.1.1.3). Explosive charges would be placed in sandy bottom areas away from exposed reefs and coral. There would be a minor, localized, unavoidable loss to some fish and benthic community populations. These shallow areas are not located in areas identified as EFH or HAPC, which occur at depths greater than 40 meters (120 feet). After exercises involving underwater detonations, the area would be searched for injured animals. The care taken to assure a clear area of operation before detonation (see 4.1.1.3), the procedures implemented in charge placement, and the infrequent occurrence of these detonations all lead to a minimal impact on marine biological resources in the area.

4.1.7.2 Land Use—Barbers Point Underwater Range, Oahu—SPECWAROPS, DEMO

Use of the range for DEMO and SPECWAROPS activities may result in temporary closure of the base shoreline for fishing and other recreational activities. The activity would not result in environmental impacts because the DEMO and SPECWAROPS activities are short in duration, and the recreation opportunities offered at the shoreline are not unique, and can be satisfied at any number of different beach settings within the island.

4.1.7.3 Safety and Health—Barbers Point Underwater Range, Oahu—SPECWAROPS, DEMO

Inert dummy mines are used in the exercises. The total net explosive weight used against each mine ranges from less than 0.5 kilogram to 9 kilograms (about 1 pound to 20 pounds).

All DEMO and SPECWAROPS activities are conducted in accordance with COMNAVSURFPAC Instructions. Prior to any explosive being detonated, divers and U.S. Navy marine mammals are transported a safe distance away from the explosive and a thorough search is made of the area for unauthorized personnel and vessels. No impacts to safety and health from RIMPAC activities are anticipated.

4.1.8 COAST GUARD AIR STATION BARBERS POINT/KALAELOA AIRPORT, OAHU

4.1.8.1 Airspace—Coast Guard Air Station Barbers Point/Kalaeloa Airport, Oahu—AIROPS, SPECWAROPS

An airship may be deployed at Coast Guard Air Station Barbers Point in order to support and monitor several RIMPAC exercises including range clearance, mine detection in shallow water and ASWEX to find subs. The airship would be shipped to Pearl Harbor and assembled at Dry-dock 4 over a period of 2 months. The airship would then potentially be moved to the Air Station and either moored there or near the adjacent private hangers, where there is an adequate concrete apron and tie downs. A temporary mooring would be needed, consisting of a 16.1- to 19.4-meter (50- to 60-foot) high mast, with truss support and guy wires, anchored by temporary stakes and jersey barriers. The airship has two engines and operates under FAA rules for powered flight.

AIROPS and SPECWAROPS would utilize existing airspace runways and adjacent areas. Moorings and associated stabilizing supports, guy wires, and anchors for the airships would be placed in existing open areas. The impacts of AIROPS on airspace would be minor and insignificant.

4.1.8.2 Biological Resources—Coast Guard Air Station Barbers Point/Kalaeloa Airport, Oahu—SPECWAROPS

SPECWAROPS would utilize existing facilities, concrete aprons, hangers, and adjacent open areas for various activities. Due to the non-intrusive nature of these activities, potential impacts to biological resources have not been identified.

4.1.9 MARINE CORPS BASE HAWAII, OAHU

4.1.9.1 Airspace—Marine Corps Base Hawaii, Oahu—C2, AIROPS, HAO/NEO, HA/DR, SPECWAROPS, AMPHIBEX

No use of controlled airspace is planned for PMRF exercises other than localized use of rotary wing and fixed-wing aircraft craft within predefined areas. No impact to airspace has been identified.

4.1.9.2 Biological Resources—Marine Corps Base Hawaii, Oahu—HAO/NEO, HA/DR, SPECWAROPS, AMPHIBEX

AAVs and LCUs with drafts exceeding 1.75 meter (5.74 feet) could inadvertently damage live coral present in shallow nearshore waters at the Hale Koa/West Field and Fort Hase beach areas (figure 2-4). LCACs and CRRCs have drafts less than 0.9 meter (2.95 feet) and are unlikely to have similar effects. Thus, the appropriate vehicle or craft would be matched to the selected landing site to minimize potential impacts to exposed reefs and coral colonies and associated benthic communities.

LCAC landings would be allowed at Hale Koa/West Field Beach, but they would be restricted from Pyramid Rock and Fort Hase beaches. The physical boundaries of the landing sites would be marked to avoid impacts to live coral and unique habitats. LCU landings would be restricted to Pyramid Rock Beach or the LCU ramp at the Base Fuel Pier (figure 2-4).

Pre-exercise beach surveys would be conducted to identify any sea turtle nests. If present, these sites would be marked and the immediate area placed off limits to personnel. Adherence to established standard operating procedures at Marine Corps Base Hawaii would result in minimal impacts to the physical environment and avoid potential impacts to threatened and endangered species. The beach and offshore waters would be monitored for the presence of marine mammals and sea turtles 1 hour before and during RIMPAC exercises. If any are seen, the exercise would be delayed until the animals leave the area.

4.1.9.3 Cultural Resources—Marine Corps Base Hawaii, Oahu—HAO/NEO, HA/DR, SPECWAROPS, AMPHIBEX

No known archaeological or historical sites are located within the RIMPAC operational areas. Standard procedures include publication of training overlays that identify any cultural resources near these areas, so they can be avoided. Thus, impacts to cultural resources are not anticipated.

4.1.9.4 Noise—Marine Corps Base Hawaii, Oahu—AIROPS, HAO/NEO, HA/DR, SPECWAROPS, AMPHIBEX

During an exercise, the total perceived noise would be the combination of ambient noise and noise from the exercises. Depending on the location, ambient noise sources may include wind, surf, highway traffic, aircraft operations, and other local noise-generating

land uses. Noise sources from the RIMPAC exercises may include helicopter operations and amphibious assault vehicles and craft.

The noise levels of LCAC activities are less than those projected for current airfield activities. However, under certain weather conditions, the sound generated by an LCAC could reach off-post areas. This impact would be mitigated by public notification and restricting LCAC training in the bay to daylight hours. No significant impact would be anticipated due to RIMPAC activities.

4.1.10 HICKAM AIR FORCE BASE, OAHU

4.1.10.1 Airspace—Hickam Air Force Base, Oahu—AIROPS, SPECWAROPS

All AIROPS and SPECWAROPS activities for RIMPAC exercises at Hickam Air Force Base are consistent with ongoing, daily activities. Thus, no airspace impacts are anticipated.

4.1.10.2 Biological Resources—Hickam Air Force Base, Oahu—SPECWAROPS, SALVAGE OPS

SPECWAROPS and SALVAGE OPS activities would be staged out of existing facilities at Hickam Air Force Base. No impacts to biological resources are anticipated.

4.1.10.3 Cultural Resources—Hickam Air Force Base, Oahu—SPECWAROPS

SPECWAROPS activities would be conducted in existing open areas and facilities at Hickam Air Force Base. None of these activities would impact known cultural resources.

4.1.11 BELLOWS AIR FORCE STATION, OAHU

4.1.11.1 Airspace—Bellows Air Force Station, Oahu—HAO/NEO HA/DR, SPECWAROPS, AMPHIBEX

RIMPAC activities entail no use of controlled airspace other than localized use of rotary wing craft within predefined areas. No impact to airspace has been identified.

4.1.11.2 Biological Resources—Bellows Air Force Station, Oahu—HAO/NEO, HA/DR, AMPHIBEX

Potential environmental impacts on terrestrial and marine biota include effects from activities such as troop, personnel, and equipment movements and amphibious vehicle landings, including LCUs and AAVs. Amphibious landings have taken place for many years at Bellows Air Force Station, and the impacts on Hawaiian beach landing sites have been assessed in a previous U.S. Navy document (U.S. Pacific Command, 1995a).

Areas of principal concern are the disturbance of live coral on the ocean floor and disturbance to threatened and endangered marine life, including the Hawksbill turtle, green sea turtles, humpback whales, and Hawaiian monk seal.

Impacts to the live coral coverage from tracked vehicles have not been found to be significant in previous studies, and are minimized by use of regular transit routes through sandy bottom areas. Amphibious vehicles are unlikely to adversely affect endangered or threatened species, such as humpback whales or green sea turtles. Crews are well-trained and follow established procedures, such as having a designated lookout watching for other vessels, obstructions to navigation, marine mammals (whales or monk seals), or sea turtles (U.S. Pacific Command, 1995a). The landing routes and beach areas would be determined to be clear of marine mammals and sea turtles within 1 hour of the landing activities. If any are seen, the exercise would be delayed until the animals leave the area.

No impacts on marine biota or threatened or endangered species from RIMPAC exercises are expected, and no mitigation measures are required. Instructions to the DoD elements engaged in amphibious exercises designed to further minimize potential impacts would include:

- Conduct surveys prior to use of amphibious launch vehicles to ensure that humpback whales are not disturbed.
- Establish buffer zones in locations where green turtles are known to feed so that amphibious exercises do not disturb these areas.
- Mark and monitor green turtle nests discovered on beaches so they are not affected by training activities.

(U.S. Pacific Command, 1995a)

Threats to terrestrial biota include the effects of soldiers or vehicles, especially tracked vehicles, disrupting habitat; however, existing ramps, trails, and roadways would be utilized. During training exercises, ground activities could temporarily impact biota on or near the shore and the littoral environment. In addition, noise and movement of vehicles, helicopters, and landing craft may temporarily displace birds such as the golden plover. Training activities are of short duration, however, and are not expected to adversely affect the areas where the birds are most likely to nest.

According to previous research, soldiers training on foot are not expected to adversely affect vegetation or wildlife in the beach landing areas, as birds and grazing animals have already facilitated the transport of seeds of exotic and noxious vegetation. Damage from tracked vehicles is not likely as long as they are restricted to existing tank trails and would not traverse off-road where they might harm vegetation. (U.S. Pacific Command, 1995a)

The base has recorded sitings of resident, native threatened and endangered species in shoreline wetlands along Waimanalo Stream on Bellows Air Force Station. However,

training within the range areas regularly used for amphibious exercises is not expected to increase the threat to these species (U.S. Pacific Command, 1995a).

4.1.11.3 Cultural Resources—Bellows Air Force Station, Oahu—HAO/NEO HA/DR, SPECWAROPS, AMPHIBEX

The potential effects of RIMPAC exercises on currently unknown cultural resources include disruption of fragile structures or sub-surface artifacts and human remains by foot and vehicle traffic. However, since the beach and adjacent areas to be utilized by RIMPAC activities are also heavily utilized by the public for recreation, potential impacts to cultural resources are not expected.

A recent archaeological survey at Bellows Air Force Station identified 18 historic and archaeological sites, including human burials (U.S. Pacific Command, 1995a). None of these sites are located in the beach landing area, but several bracket the area. The two closest sites (4852 and 4851) have site features of habitation, workshop, and burials. Site 4852 includes the 018 Bellows Dune Site, which is on the NRHP, and may be one of the earliest Hawaiian occupations on the Islands. Both areas are identified as off-limits on training overlays to ensure that there is no disturbance caused by training. Site 4851 is within an adjacent maneuver training area. Site 4852 is north of Waimanalo Stream and outside training areas. (U.S. Pacific Command, 1995a). Thus, impacts to cultural resources are not anticipated.

4.1.11.4 Land Use—Bellows Air Force Station, Oahu—HAO/NEO, HA/DR, SPECWAROPS, AMPHIBEX

Use of the beach and adjacent areas at Bellows Air Force Station by RIMPAC activities would not change or alter on-base or off-base land use patterns. However, since the beach area is open to the public from noon on Fridays until 8:00 a.m. on Monday, any RIMPAC activities during a weekend would require closure of the beach to public access. These closures would be kept to the minimum time needed to conduct the exercises and ensure the public is properly protected. For example, in RIMPAC 02 the beach is planned to be closed only one weekend day. Standard modification procedures would be followed. Overall, the impacts to land use are considered to be temporary and insignificant.

4.1.11.5 Noise—Bellows Air Force Station, Oahu—HAO/NEO, HA/DR, SPECWAROPS, AMPHIBEX

During an amphibious landing exercise, the total perceived noise would be the combination of ambient noise and noise from the exercises. Depending on the location, ambient noise sources may include noise from wind, surf, highway traffic, aircraft operations, and other local noise-generating land uses. Noise sources from the exercise may include helicopter operations, fixed wing aircraft, and operation of diesel engines of landing craft and tracked vehicles. Noise can affect on-base as well as off-base land uses. Noise levels depend on the relative location of the sources of noise and the observation or measurement point. The addition of multiple noise sources and attenuation of noise levels are non-linear processes.

Noise studies conducted at Bellows Air Force Station have been performed during amphibious training exercises to determine the likely propagation of noise under realistic conditions (U.S. Pacific Command, 1995a). The results of these studies indicate the Proposed Action would not exceed noise thresholds in any off-base areas.

4.1.12 KAHUKU TRAINING AREA, OAHU

4.1.12.1 Airspace—Kahuku Training Area, Oahu—HAO/NEO, HA/DR, SPECWAROPS

Activities entail no use of controlled airspace other than localized use of rotary wing aircraft within predefined areas. No impact to airspace has been identified.

4.1.12.2 Biological Resources—Kahuku Training Area, Oahu—HAO/NEO, HA/DR, SPECWAROPS

Potential SPECWAROPS activities include a reconnaissance and survey mission and a tactical aircrew recovery operation. Potential HA/DR and HAO/NEO exercises would utilize existing open areas and facilities. Some temporary structures including tents may be utilized. All of these operations are non-intrusive in nature. All participants would follow training guidelines (table 4-2) set forth in the Ecosystem Management Plan Report. (U.S. Army Garrison, Hawaii, and U.S. Army Corps of Engineers, 1998a). Therefore, there would be no impacts to biological resources due to proposed RIMPAC activities in the Kahuku Training Area.

4.1.12.3 Cultural Resources—Kahuku Training Area, Oahu—HAO/NEO, HA/DR, SPECWAROPS

There would be no unmonitored ground-disturbing activities, land clearing, or use of vehicles off existing trails and roads. All personnel entering the Kahuku Training Area would adhere to the training guidelines presented in the Ecosystem Management Plan Report (U.S. Army Garrison, Hawaii, and U.S. Army Corps of Engineers, 1998a). Therefore, no impacts to cultural resources within the Kahuku Training Area are anticipated.

4.1.13 MAKUA MILITARY RESERVATION, OAHU

4.1.13.1 Airspace—Makua Military Reservation, Oahu—LFX, SPECWAROPS

Live fire exercises and SPECWAROPS can include localized use of rotary wing aircraft within predetermined areas. All LFXs are conducted in accordance with the Makua Military Reservation LFX Standard Operating Procedure (U.S. Army Garrison, Hawaii, 1998). No impact to airspace has been identified.

Table 4-2: Training Guidelines for Resource Protection—All Oahu Training Areas

APPLIES TO

The following list of actions and limitations applies to all Oahu training areas. Additional limitations are imposed in the Sensitive Ecological and Cultural Resource Areas.

AUTHORITY

Enforcement of the following rules is under the authority of the Directorate of Plans, Training, Mobilization and Security, Range and Training Support Division.

REQUIRED ACTIONS

- Access** Before entering a training area, troops must clean all vehicles, equipment, personal gear, shoes, and clothing.
- Fire** All fires must be reported immediately.
- In case of fire, troops will stop training operations and begin fighting the fire.
- Troops will continue to fight the fire until released by the Fire Department.
- Water** All aviation or other training area fuels or chemicals and other potentially toxic and polluting substances must be handled and stored to avoid spills and fires.

LIMITATIONS FOR SENSITIVE ECOLOGICAL AND CULTURAL RESOURCE AREAS

- Access** No troops may go beyond signs or fences marking the presence of rare or endangered plants and animals or archaeological sites.
- Bivouacking** No bivouacking within 1,000 meters of posted signs marking the presence of rare or endangered native plants and animals or restoration projects.
- No training units larger than platoon size (more than 30 troops) may bivouac outside of reusable bivouac sites provided with portable or fixed latrines.
- No open fires.
- No burying or leaving trash.
- No food preparation.
- No refueling operations.
- No cutting, clearing, or disturbing of vegetation. This includes mosses, grasses, shrubs, bushes, and trees.
- Maneuvers** No vehicle traffic off existing roads.
- No use of rocks from rock piles or walls for training purposes.
- No establishment or new vehicle tracks.
- No digging, including entrenchment and foxholes, except in areas specifically designated by Range Control.
- Dillingham Military Reservation and Kahuku Training Area: No pyrotechnic or incendiary training devices except during the wet season (October to April) OR outside areas designed to control fire.
- No new placement of barbed wire or concertina wire near signs marking the presence of sensitive ecological areas or fences.
- Dillingham Military Reservation and Kahuku Training Area: No use of live fire or tracer ammunition.
- No road, trail, or fire break clearing without permission from Range Control.
- No grading or construction of buildings or other permanent structures without permission from Range Control.

Source: U.S. Army Garrison, Hawaii, and U.S. Army Corps of Engineers, 1998a.

4.1.13.2 Biological Resources—Makua Military Reservation, Oahu—LFX, SPECWAROPS

Makua Military Reservation is host to 32 threatened or endangered species including a tree snail (*Achatinella mustelina*). These species are generally confined to remote mountainous areas along the fringe of the range, outside maintained open areas and the impact area. They are potentially affected by vehicle and foot traffic, trail clearing, live munitions training, and munitions-induced fires. Indirect impacts, such as the inadvertent introduction and spread of destructive exotic plants and animals, are also possible. The Standard Operating Procedure for Makua Military Reservation restricts exercise activities to areas that are outside of sensitive habitat. An Endangered Species Management Plan Report has been prepared for the Makua Military Reservation range that sets out a series of preventative and restorative activities appropriate to these resources. LFX and SPECWAROPS activities would follow the preventive measures outlined in the management plan. Therefore, no impact to threatened and endangered species is anticipated. (U.S. Army Garrison, Hawaii, and U.S. Army Corps of Engineers, 1997a)

4.1.13.3 Cultural Resources—Makua Military Reservation, Oahu—LFX, SPECWAROPS

Ongoing training and live fire exercises at Makua Military Reservation have the potential to impact cultural resources. An Ecosystem Management Plan Report for the protection of these resources has been developed (U.S. Army Garrison, Hawaii, and U.S. Army Corps of Engineers, 1998a). The plan focuses on identification, education, and avoidance of known archaeological sites. The Standard Operating Procedure for Pilila’au Range, Makua Military Reservation LFX is designed to avoid these resources (U.S. Army Garrison, Hawaii, 1998). Therefore, no impacts to cultural resources are anticipated.

4.1.13.4 Noise—Makua Military Reservation, Oahu—LFX, SPECWAROPS

During a RIMPAC exercise, the total perceived noise would be the combination of ambient noise and noise from the exercises. Ambient noise sources may include wind, surf, highway traffic, aircraft operations, and other local noise-generating land uses. Noise sources from the exercise would include the use of helicopters and small arms munitions. No noise impacts are anticipated.

4.1.13.5 Safety and Health—Makua Military Reservation, Oahu—LFX, SPECWAROPS

Live fire training occurs routinely at Makua Military Reservation. The DoD takes every reasonable precaution during the planning and execution of the operation of training exercises to prevent injury to human life and wildlife, or damage to property. Specific safety plans have been developed to ensure that each hazardous operation is in compliance with applicable policy and regulations and to ensure that the general public and range personnel and assets are provided an acceptable level of safety. For LFX, a Standard Operating Procedure has been developed which outlines all safety requirements for use of Makua Military Reservation (U.S. Army Garrison, Hawaii, 1998). No impacts to safety and health are anticipated.

4.1.14 DILLINGHAM MILITARY RESERVATION, OAHU

4.1.14.1 Airspace—Dillingham Military Reservation, Oahu—SPECWAROPS

Activities entail no use of controlled airspace other than localized use of rotary wing aircraft within predefined areas for reconnaissance and survey inserts. Helicopter raids would involve approximately six helicopters over a 2- to 6-hour period. Most operations would be conducted at night when the airfield is not in use. No impact to airspace has been identified.

4.1.14.2 Biological Resources—Dillingham Military Reservation, Oahu—SPECWAROPS

Potential SPECWAROPS activities on the Dillingham Military Reservation include reconnaissance activities and a helicopter raid. There would be no anticipated impacts to biological resources due to the limited number of participants, the non-intrusive nature of these activities, and the adherence of all participants to the training guidelines (table 4-1) set forth in the Ecosystem Management Plan Report (U.S. Army Garrison, Hawaii, and U.S. Army Corps of Engineers, 1998a).

4.1.14.3 Cultural Resources—Dillingham Military Reservation, Oahu—SPECWAROPS

There would be no unmonitored ground-disturbing activities, land clearing, or use of vehicles off existing trails and roads, assembly of “hasty fortifications,” or litter accumulation. All personnel entering the Dillingham Military Reservation would adhere to the training guidelines (table 4-1) presented in the Ecosystem Management Plan Report (U.S. Army Garrison, Hawaii, and U.S. Army Corps of Engineers, 1998a). Therefore, no impacts to cultural resources within the Dillingham Military Reservation would be anticipated.

4.1.15 WHEELER ARMY AIRFIELD, OAHU

4.1.15.1 Biological Resources—Wheeler Army Airfield, Oahu—C2, AIOPS, SPECWAROPS

No impacts to biological resources have been identified from the utilization of existing runways and associated facilities and cleared areas by C2, SPECWAROPS, and AIOPS exercises. These exercises would fall within existing operations for the airfield.

4.1.16 K-PIER KAWAIHAE, HAWAII

4.1.16.1 Biological Resources—K-Pier Kawaihae, Hawaii—SPECWAROPS, AMPHIBEX

The potential that SPECWAROPS and AMPHIBEX activities at K-Pier would impact biological resources is very small. These activities would utilize the existing ramps and a small open beach adjacent to the ramps, and have been conducted in the past at the harbor. No reef or coral areas would be impacted. The amphibious landing would follow existing procedures for entering the harbor and unloading equipment and supplies at the boat ramp. These procedures include inspections by appropriate federal and/or state

agencies of vehicles and equipment from foreign countries to prevent the introduction of alien species. A recycling wash rack would be utilized to clean foreign country vehicles and equipment prior to back-loading to control the spread of alien species. Therefore, no impact to biological resources is anticipated.

4.1.16.2 Land Use—K-Pier Kawaihae, Hawaii—AMPHIBEX

K-Pier is an existing ramp that has an ongoing use for off-loading and back-loading of military personnel, equipment, and supplies. Amphibious vehicles and craft have utilized K-Pier and the adjacent beach area also in the past. These activities have the potential to impact access via the north gate, to the Pua Ka'ilima Okawaihae Cultural Surf Park when large volumes of vehicles and equipment are off-loaded or back-loaded. However, use of the park is not disrupted since access is still available from the south gate.

RIMPAC activities at K-Pier would not significantly differ from normal on-going activities. Under the maximum RIMPAC scenario, where a full brigade would land and back-load at K-Pier, access to and use of the park may be temporarily disrupted. This potential impact would be eliminated by efficient management of the loading/unloading process.

A portable or permanent recycling washrack would be required in the future to properly clean foreign country vehicles and equipment prior to departure from K-Pier. This washrack would reduce the likelihood that non-native plant and animals species would become established in a foreign country. The washrack would be located on existing property controlled by the U.S. Army.

Overall the impacts from RIMPAC exercises at K-Pier would be minor and insignificant.

4.1.17 BRADSHAW ARMY AIRFIELD, HAWAII

4.1.17.1 Airspace—Bradshaw Army Airfield, Hawaii—C2, AIROPS, SPECWAROPS

Activities entail no use of controlled airspace other than localized use of rotary wing aircraft within predefined areas for reconnaissance and survey inserts. Helicopter raids would involve approximately six helicopters over a 2- to 6-hour period. C2 functions could be employed at Bradshaw Army Airfield to control flight movements for training exercises on Pohakuloa Training Area. No impact to airspace has been identified.

4.1.17.2 Biological Resources—Bradshaw Army Airfield, Hawaii—AIROPS, SPECWAROPS

Proposed use of the Bradshaw Army Airfield includes helicopter raids and survey and reconnaissance insertions. Both of these activities are limited in scope and non-invasive in nature. Neither of these activities would impact the areas beyond the airfield itself. Airfield activities are evaluated in the Bradshaw Army Airfield AICUZ. All personnel entering Bradshaw Army Airfield would follow the guidelines (table 4-1) set forth in the Ecosystem Management Plan Report, Pohakuloa Training Area (U.S. Army Garrison,

Hawaii, and U.S. Army Corps of Engineers, 1998b). Adherence to these guidelines would further limit the potential for introduction of weed plant species as well as reduce any incipient risk of fire or damage due to training activities. No adverse impacts to biological resources at Bradshaw Army Airfield are anticipated due to the Proposed Action.

4.1.17.3 Cultural Resources—Bradshaw Army Airfield, Hawaii—SPECWAROPS

The proposed survey and reconnaissance insertions and subsequent helicopters raids are both of limited scope and non-invasive in nature. Neither of these activities would impact the area beyond the immediate vicinity of Bradshaw Army Airfield. No archaeological sites have been identified in the area. Therefore, no impacts to archaeological resources at Bradshaw Army Airfield are anticipated due to the Proposed Action.

4.1.18 POHAKULOA TRAINING AREA, HAWAII

4.1.18.1 Airspace—Pohakuloa Training Area, Hawaii—C2, STWEX, CASEX, LFX, SPECWAROPS

STWEX and CASEX training and LFT and SPECWAROPS exercises occur routinely at the Pohakuloa Training Area and are confined to the special use airspace R-3103 associated with Bradshaw Army Airfield and the range associated with the Pohakuloa Training Area. Air activity is controlled and coordinated by Pohakuloa Training Area Range Control. For operations including 10 or more aircraft, the Bradshaw Army Airfield manager submits a NOTAM to Honolulu Flight Service Station to be published as a Honolulu Local NOTAM and as a Class D NOTAM. The Bradshaw Army Airfield manager provides this information to the airfield Air Traffic Information Service (U.S. Army Garrison, Hawaii, 1996).

No effects on airspace resulting from RIMPAC have been identified in the airspace surrounding the training area.

4.1.18.2 Biological Resources—Pohakuloa Training Area, Hawaii—STWEX, CASEX, LFX, SPECWAROPS

STWEX, CASEX, and associated LFX training at Pohakuloa Training Area are confined to the impact area (figure 2-6). SPECWAROPS would primarily utilize existing trails and roads in the Pohakuloa Training Area. An Integrated Natural Resource Management Plan for Pohakuloa Training Area (U.S. Army Garrison, Hawaii, and U.S. Army Corps of Engineers, 1998b) has been prepared to address protection and management of resources. The impacts of RIMPAC exercises on biological resources are not likely to be significant.

4.1.18.3 Cultural Resources—Pohakuloa Training Area, Hawaii—STWEX, CASEX, LFX, SPECWAROPS

STWEX, CASEX, and LFX exercises at Pohakuloa Training Area are confined to the impact area (figure 2-6). SPECWAROPS would primarily utilize existing trails and roads in the Pohakuloa Training Area. An Ecosystem Management Plan Report for Pohakuloa Training Area (U.S. Army Garrison, Hawaii, and U.S. Army Corps of Engineers, 1998b) addresses

avoidance, protection, and management of cultural resources. Therefore, impacts of RIMPAC exercises on cultural resources are not anticipated.

4.1.18.4 Noise—Pohakuloa Training Area, Hawaii—STWEX, CASEX, LFX, SPECWAROPS

STWEX, CASEX, LFX, and SPECWAROPS exercises occur routinely during daylight hours at the Pohakuloa Training Area. Airfield activities are evaluated in the Bradshaw Army Airfield AICUZ. The noise associated with RIMPAC exercises is generally limited to high-intensity, short-duration sound events that are confined to the designated impact areas for the range. The impact area is in an isolated area away from residential land uses. There are no known sensitive receptors within 8 kilometers (5 miles). Therefore, noise impacts are not anticipated.

4.1.18.5 Safety and Health—Pohakuloa Training Area, Hawaii—STWEX, CASEX, LFX, SPECWAROPS

STWEX, CASEX, LFX, and SPECWAROPS exercises occur routinely at the Pohakuloa Training Area. The DoD takes every reasonable precaution during the planning and execution of the operation of training exercises to prevent injury to human life and wildlife, or damage to property. Specific safety plans are developed to ensure that each hazardous operation is in compliance with applicable policy and regulations and to ensure that the general public and range personnel and assets are provided an acceptable level of safety. For missile and weapons systems, Pohakuloa Training Area Safety Office establishes criteria for the safe execution of training activities in the form of Range Safety Approval and Range Safety Operational Plan documents, which are required for all weapon and target systems using Pohakuloa Training Area. These include the allowable launch and flight conditions and flight control methods to contain the missile flight and impacts within the predetermined impact hazard areas that have been determined to be clear of nonessential personnel and aircraft (Pacific Missile Range Facility, Barking Sands, 1998).

The impact area is in an isolated area with restricted access located away from the civilian population. Safety and health precautions are covered in External Standard Operating Procedures and are briefed by the Pohakuloa Training Area Operations Center (U.S. Army Garrison, Hawaii, 1996). Impacts of RIMPAC exercises at Pohakuloa Training Area on safety and health are not anticipated.

4.1.18.6 Water Resources—Pohakuloa Training Area, Hawaii—STWEX, CASEX, LFX, SPECWAROPS

Missile and LFX training occurs routinely at the Pohakuloa Training Area. Similar RIMPAC exercises would not result in adverse effects on water resources in the vicinity.

4.1.19 OCEAN AREA, HAWAIIAN ISLANDS

4.1.19.1 Airspace—Ocean Area, Hawaiian Islands—C2, SAMEX, AAMEX, ASMEX, SSMEX, ASWEX, MINEX, STWEX, GUNNEX, SINKEX, SPECWAROPS, SUBOPS

RIMPAC exercises occur routinely within existing Restricted Areas and Warning Areas under the control of PMRF and FACSFACPH. For operations including 10 or more aircraft, the airspace manager submits a NOTAM to the affected Flight Service Station and includes this information to the airfield Air Traffic Information Service (U.S. Army Garrison, Hawaii, 1996).

The ongoing, continuing Fleet Training Exercises, including RIMPAC activities, would continue to utilize the existing overwater airspace. No new special use airspace proposal or any modification to the existing special use airspace is contemplated to accommodate continuing mission activities. Consequently, no new impacts to the airspace over the open ocean have been identified from RIMPAC activities (Pacific Missile Range Facility, Barking Sands, 1998).

4.1.19.2 Biological Resources—Ocean Area, Hawaiian Islands—SAMEX, AAMEX, ASMEX, SSMEX, ASWEX, MINEX, STWEX, GUNNEX, SINKEX, DEMO, SUBOPS

The potential for any harm to whales, monk seals, or sea turtles from the various RIMPAC exercises is remote. Personnel are aware that they are not to harm or harass whales, monk seals, or sea turtles. As part of the required clearance before an exercise, the target area must be inspected visually and determined to be clear. The required clearance zones at the target areas, and exercises within controlled ranges at PMRF, keep the risk to whales, monk seals, or sea turtles remote.

Open ocean clearance procedures are the same for live or inert ordnance. Whenever ships and aircraft use PMRF's range for missile and gunnery practice, the weapons are used under controlled circumstances involving clearance procedures to ensure whales, monk seals, or sea turtles are not present in the target area. These involve, at a minimum, a detailed visual search of the target area by aircraft reconnaissance, range safety boats, and range controllers supplemented by radar and the hydrophones on the range. Ordnance cannot be released until the target area is determined clear. Operations are immediately halted if whales, monk seals, or sea turtles are observed within the target area. Operations are delayed until the animal clears the target area. All observers are in continuous communication in order to have the capability to immediately stop the operations. The exercise can be modified as necessary to obtain a clear target area, or it is canceled. All of these factors serve to avoid the risk of harming whales, monk seals, or sea turtles.

The weapons used in most missile, GUNNEX, and SINKEX exercises poses little risk to whales, monk seals, or sea turtles unless they were to be near the surface at the point of impact. Both 50 caliber machine guns and the close-in weapons systems exclusively fire non-explosive ammunition. The same applies to larger weapons firing inert ordnance for training exercises. These rounds pose a risk only at the point of impact. The use of

explosive ordinance or an explosion from a DEMO activity as a part of a SINKEX would have a higher potential to impact marine species. Target area clearance procedures would again reduce this risk.

Targets are launched from PMRF downrange into Warning Areas W-186 and W-188 as targets for surface ship anti-air warfare training. The actual area for engaging the drone as a target is well outside the 183-meter (100-fathom, or 600-foot) depth. Upon completion of the exercise, recoverable drones would be retrieved and refurbished for later use.

The potential for any harm to marine mammals (especially whales or monk seals) or sea turtles from targets or expended munitions is remote. PMRF clearance procedures make it highly unlikely that marine mammals or sea turtles could remain on the target area undetected for very long. All observers are in continuous communications and have the capability to immediately delay or suspend the operations. An exercise is immediately halted if marine mammals or sea turtles are detected in a target area. For a marine mammal or sea turtle to be injured, it would have to enter the target area undetected and then surface at the exact point where a projectile, spent missile, or spent target landed. A marine mammal or sea turtle might momentarily change its behavior if overflown by a drone at low altitude, but this effect would be a random, transitory event. There is no information presently available which indicates any indirect impacts from these types of activities on marine mammals or sea turtles. (Pacific Missile Range Facility, Barking Sands 1998)

Anti-submarine warfare is the primary role for U.S. Navy patrol aircraft and anti-submarine warfare helicopters. Anti-submarine warfare aircrews must practice using sensors, including electro-optical devices, radar, magnetic anomaly detectors, sonar (including helicopter dipping sonar and both active and passive sonobuoys) in both the deep and shallow water environment. Magnetic anomaly detection systems and dipping sonar must be employed at low altitude to be effective. The potential for operations having harmful effects on whales, monk seals, or sea turtles is extremely small. The U.S. Navy has conducted these operations in the Hawaiian Islands for decades and is unaware of any harmful effects on whales, monk seals, or sea turtles. Aircrews are trained to visually scan the surface of the water for anomalies. Due in part to this additional emphasis on visual scanning and the availability of extra crew members to conduct such searches, it is unlikely that whales, monk seals, or sea turtles would be undetected when the aircraft are flying at lower altitudes. If whales, monk seals, or sea turtles are detected, the flight path can be adjusted to meet the avoidance requirements.

The use of sonobuoys is generally limited to areas outside 183 meters (100 fathoms, or 600 feet). Before dropping sonobuoys, the crew visually determines that the area is clear. Although the altitude at which buoys are dropped varies, the potential for drift during descent generally favors release at lower altitudes, where visual searches for whales, monk seals, or sea turtles are more effective. When the sonobuoy is released, a small parachute retards its entry into the ocean so that it sinks to less than 3 meters (10 feet) before it floats back to the surface. Location of buoy drops, visual search, and the slow rate of

descent dramatically reduce the possibility of either injuring or having any effect on whales, monk seals, or sea turtles.

The very low power of the battery-driven active sonobuoy ensures that the likelihood of injury to whales, monk seals, or sea turtles from the sonar is small. The only potential effect would be for the whales, monk seals, or sea turtles to detect this low power pulsed signal and avoid it.

Whenever aircraft use the ranges for air anti-submarine warfare exercises with inert torpedoes, the weapons are used under controlled circumstances involving procedures to ensure whales, monk seals, or sea turtles are not present in the target area. These involve, at a minimum, a detailed visual target area search by the aircraft releasing the weapon and additional chase aircraft (as necessary), range safety boats, and range controllers. Weapons cannot be released until the target area is determined clear. Operations are immediately halted if whales, monk seals, or sea turtles are detected in the target area. All observers have the capability to immediately delay or suspend the operations. The exercise can be modified as necessary to obtain a clear target area, or it is canceled. These controls are additive factors to ensure that the chance of injuring whales, monk seals, or sea turtles is remote.

SUBOPS in open ocean areas, including existing underwater training areas between the islands of Maui, Lanai, and Molokai, would follow open ocean clearance procedures to ensure the activity would not adversely impact marine mammals and sea turtles. The firing and tracking of non-explosive torpedoes in these training areas would not result in any significant adverse impacts to biological resources.

4.1.19.3 Safety and Health—Ocean Area, Hawaiian Islands—SAMEX, AAMEX, ASMEX, SSMEX, ASWEX, STWEX, GUNNEX, SINKEX, SPECWAROPS, DEMO, SUBOPS

All PMRF- and FACSFACPH-controlled fleet training activities that occur over the open water would continue to be conducted mainly in Warning Areas and Restricted Airspace. Range Safety officials ensure the safe operation of projectiles, targets, missiles, air operations, and other hazardous fleet training activity in controlled areas. The range safety procedures avoid risks to the public and operations. Before any operation is allowed to proceed, the overwater target area is determined to be clear using inputs from ship sensors, visual surveillance of the range from aircraft and range safety boats, radar data, and acoustic. In addition, prior to conducting any training on PMRF, the operation must obtain PMRF safety approval before proceeding, covering the type of weapon, type of target, speed, altitude, debris corridor, and surface water hazard area (Pacific Missile Range Facility, Barking Sands, 1998).

Since the target areas are cleared of personnel prior to any operations being conducted, the only public health and safety issue is if an operation exceeds the safety area boundaries. Risk to public health and safety is reduced by providing termination systems on some of the missiles and by determining that the target area—based on the distance the system can travel for those missiles without flight termination (typical air-to-air missile)—is

clear. In the cases where a system does not have a flight termination, the target area is determined clear for unauthorized vessels and aircraft, based on the flight distance the vehicle can travel, plus an 8-kilometer (5-mile) area beyond the system performance parameters (Pacific Missile Range Facility, Barking Sands, 1998).

In addition, all activities must be in compliance with DoD Directive 4540.1 and OPNAVINST 3770.4A, which specify procedures for conducting aircraft operations and for missile/projectile firing, namely the missile/projectile "firing areas shall be selected so that trajectories are clear of established oceanic air routes or areas of known surface or air activity."

Missile training exercises occur routinely during daylight hours within Restricted Area R-3101 and Warning Area W-188 under the control of PMRF. The DoD takes every reasonable precaution during the planning and execution of the operation of training exercises to prevent injury to human life and wildlife or damage to property. Specific safety plans are developed to ensure that each hazardous operation is in compliance with applicable policy and regulations and to ensure that the general public and range personnel and assets are provided an acceptable level of safety. For missile and weapons systems, PMRF Safety establishes criteria for the safe execution of the test operation in the form of Range Safety Approval and Range Safety Operational Plan documents, which are required for all weapon and target systems using the Warning Areas. These include the allowable launch and flight conditions and flight control methods to contain all the munitions and missile within the predetermined target areas, ordnance drop zones, and jettison areas that have been determined to be clear of nonessential personnel and aircraft (Pacific Missile Range Facility, Barking Sands, 1998).

The impacts of missile training exercises on safety and health are not expected to be different for RIMPAC training than for routine training activities customarily conducted in open water training areas.

All DEMO activities associated with a SINKEX are conducted in accordance with COMNAVSURFPAC Instruction 3120.8D (Department of the Navy, 1993). No impacts to safety and health from RIMPAC DEMO activities are anticipated.

4.1.19.4 Water Resources—Ocean Area, Hawaiian Islands—SAMEX, AAMEX, ASMEX, SSMEX, ASWEX, STWEX, GUNNEX, SINKEX, DEMO, SUBOPS

The National Aeronautical and Space Administration conducted a thorough evaluation of the effects of munitions and missile systems that are deposited in seawater. It concluded that the release of hazardous materials aboard munitions and missiles into seawater would not be significant. Materials would be rapidly diluted and, except for the immediate vicinity of the debris, would not be found at concentrations identified as producing any adverse effects. The Pacific Ocean depth in the vicinity of the target area is hundreds of meters (feet) deep, and consequently the water quality impact from soluble materials is expected to be minimal. Any area affected by the slow dissolution of the propellant would be

relatively small due to the size of the target drone motor and/or missile propellant pieces relative to the quantity of seawater (Pacific Missile Range Facility, Barking Sands, 1998).

The RIMPAC exercises have not resulted in adverse impacts on water resources in the vicinity.

4.1.20 KEEHI LAGOON, OAHU

4.1.20.1 Biological Resources—Keehi Lagoon, Oahu—SALVAGE OPS

SALVAGE OPS in Keehi Lagoon would produce a minor, temporary, localized increase in turbidity as the sections of the old barges are lifted from the bottom. Use of turbidity control devices is not deemed warranted due to the sand/silt substrate and the small (about 6 meters [20 feet] in length) sections of the barge to be removed at any one time. Also, any substantial turbidity increases would limit the visibility of the divers; therefore, every effort would be made to limit actions that would decrease water clarity. The Hawaii Department of Land and Natural Resources has surveyed the barges and determined they do not appear to contain oil or hazardous substances (Naval Base Pearl Harbor and State of Hawaii, 1996). Removal of the barges would also eliminate habitat for some marine organisms, especially reef type species, but these species would quickly relocate to other areas. Overall, the impacts to biological resources are considered minor and insignificant.

4.1.20.2 Socioeconomics—Keehi Lagoon, Oahu—SALVAGE OPS

Removal of the old sunken barges in Keehi Lagoon would have a positive socioeconomic impact on Oahu. Navigation traffic and seaplane conditions would be improved as well as opportunities for unobstructed water recreation activities.

4.2 NO-ACTION ALTERNATIVE

Under the No-action Alternative, RIMPAC would not be conducted. The existing exercises would not be combined into a multi-national, sea control/power projection fleet training exercise in a multi-threat environment. However, the individual exercises would continue to take place in the open-ocean, nearshore, and onshore environments where they are routinely conducted. Therefore, the potential impacts of the No-action Alternative would be similar to those described for the Proposed Action except for socioeconomics in Honolulu (IN-PORT).

4.3 CUMULATIVE IMPACTS

In addition to the ongoing military activities in the Hawaiian Islands area, several other programs are reasonably foreseeable at this time. The Minimum Cost Design Upper Stage program would be a joint Missile Defense Agency (formerly Ballistic Missile Defense Organization) and U.S. Air Force program that would modify the Strategic Target System

vehicle. Existing facilities at KTF would be used. There would be no overlap of activities with RIMPAC exercises, and therefore cumulative impacts would not be anticipated.

The proposed enhancement of facilities and capabilities at PMRF was evaluated in the PMRF Enhanced Capability EIS (Pacific Missile Range Facility, Barking Sands, 1998). The modifications considered would support DoD Theater Missile Defense and U.S. Navy Theater Ballistic Missile Defense test and evaluation activities, including upgrading of existing facilities, construction of launch facilities, and launch of missiles. The program would potentially affect locations on Oahu, Kauai, Niihau, Kaula, Maui, and various Warning Areas. Locations on Tern Island and Johnston Atoll were dropped from the final PMRF Enhanced Capability EIS (Pacific Missile Range Facility, Barking Sands, 1998) includes RIMPAC as one of the ongoing Fleet Exercises and concluded that cumulative impacts are not expected from RIMPAC and other ongoing exercises and the proposed enhancement activities.

4.4 MITIGATION MEASURES

RIMPAC is a coordinated exercise made up of operations and activities that routinely occur at a variety of locations in the Hawaiian Islands. RIMPAC would comply with all existing standard operating procedures and mitigations specific to the individual exercises and locations making up the coordinated RIMPAC. Mitigations associated with resource areas considered in this environmental document have been incorporated into section 2.2 and in the sections addressing specific locations in chapter 4.0. In addition, the RIMPAC OPODER Environmental Annex (appendix A) listed environmental requirements particular to the RIMPAC coordinated exercise. Additional environmental requirements have been incorporated into the planning of individual components of RIMPAC and are included in the appropriate sections of the RIMPAC OPODER.

4.5 ADVERSE ENVIRONMENTAL EFFECTS THAT CANNOT BE AVOIDED

Unavoidable short-term effects would be associated with temporary closure of the southern portion of Polihale State Park during some missile launching activities at PMRF, during amphibious landings at PMRF and Bellows Air Force Station, and DEMO exercises at PMRF and Barbers Point Underwater Range. However, the amount of closure time would not result in any long-term impacts to recreational activities or subsistence fishing uses. In addition, there would be some short-term disruption of fishing by ships within the PMRF overwater range.

Other unavoidable effects, such as the startling of wildlife, marine and terrestrial species and some threatened and endangered species, would result from firing of weapons, underwater detonation and missile launches. Similar training is ongoing, and the resources are adapted or existing mitigations are working. In addition, noise from U.S. Navy ships

may also impact marine species. Noise from other activities such as helicopters and aircraft may startle wildlife. The impacts from these noise sources would be short-term and are not expected to jeopardize the existence of any threatened, endangered, or marine species. Noise from missile launching activities may also startle some residents on the island of Kauai.

4.6 CONSISTENCY WITH FEDERAL, REGIONAL, STATE, LOCAL, OR NATIVE AMERICAN LAND-USE PLANS, POLICIES, AND CONTROLS

Neither the Proposed Action nor the No-action Alternative conflicts with any land use plans, policies, or controls as summarized below:

- The Proposed Action will be conducted on government and private land in accordance with the Hawaii Coastal Zone Management Act.
- The Proposed Action would be compatible with State of Hawaii, county, and local land use plans, policies, and controls.

4.7 ENERGY REQUIREMENTS AND CONSERVATION POTENTIAL

Anticipated energy requirements of program activities can be accommodated within the energy supply of the region. Energy requirements would be subject to any established energy conservation practices.

4.8 IRREVERSIBLE OR IRRETRIEVABLE COMMITMENT OF RESOURCES

The amount of materials and energy required for any program-related activities would be small. Although the proposed activities would result in some irreversible and irretrievable commitment of resources such as fuel, various metallic materials, minerals, and labor, this commitment of resources is not significantly different from that necessary for many other defense training activities. It is similar to the activities that have been carried out in previous RIMPAC exercises over the past several years.

4.9 RELATIONSHIP BETWEEN SHORT-TERM USES OF THE HUMAN ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

Proposed RIMPAC activities at all locations would take advantage of existing facilities and infrastructure. The proposed activities would not alter the usage of the sites, which is to support training and testing. Therefore, the Proposed Action would not eliminate any options for future use of the environment for the locations under consideration.

4.10 NATURAL OR DEPLETABLE RESOURCE REQUIREMENTS AND CONSERVATION POTENTIAL

Other than the use of various structural materials and fuels, no significant use of natural or depletable resources would be required for RIMPAC activities.

4.11 FEDERAL ACTION TO ADDRESS ENVIRONMENTAL JUSTICE IN MINORITY POPULATIONS AND LOW-INCOME POPULATIONS

EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-income Populations*, requires federal agencies to identify disproportionately high and adverse human health and environmental effects of their actions on minority and low-income populations. Based on the findings presented in this EA, implementation of the Proposed Action would have little likelihood of having disproportionate impacts on any low-income or minority groups.

4.12 FEDERAL ACTION TO ADDRESS PROTECTION OF CHILDREN FROM ENVIRONMENTAL HEALTH RISKS AND SAFETY RISKS

EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, requires federal agencies to identify any adverse impacts for a federal action to the health and safety of children. Implementation of the Proposed Action would have little likelihood of any significant adverse impacts upon the health and safety of children living near any of the ranges or facilities to be utilized during any RIMPAC exercise.

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CONSULTATION AND COORDINATION

5.0 CONSULTATION AND COORDINATION

RIMPAC is a multi-national coordination and communications exercise designed and conducted to ensure that the United States can accomplish shared operational objectives with other nations. As such, RIMPAC is composed of joint, routine ongoing military exercises, conducted at the locations where they would normally occur as individual exercises.

Coastal Zone Management

The U.S. Navy has determined that no additional Coastal Zone Consistency Determination is required. Consistent with the Coastal Zone Management Act of 1972, individual activities that would occur as a part of RIMPAC, within U.S. Territorial Waters, have been evaluated and either determined to pose no conflict with the Hawaii Coastal Zone Management Program, Chapter 205A, Hawaii Revised Statutes, or State of Hawaii Coastal Zone Management Policies and approved related resource management programs, or through a prior consistency determination process the U.S. Navy has taken steps to ensure that these activities are consistent, to the maximum extent practicable, with the approved state management programs referenced above. All activities considered for RIMPAC would be conducted at locations where they are routinely conducted individually, with no change to coastal characteristics or in the potential effect to coastal resources (recreational, historic, scenic and open space, coastal ecosystems, economic uses, coastal hazards, beach areas, and marine resources). All mitigations identified and adopted through a prior consistency determination process will be implemented for RIMPAC.

State Historic Preservation Office Section 106 of the National Historic Preservation Act

Prior consultation has occurred as required by Section 106 and defined in 36 CFR 800, of the Advisory Council on the Historic Preservation's regulations, *Protection of Historic Properties*, where required, individually for all ongoing activities that are proposed for RIMPAC. Historic properties and cultural resource sites at all involved locations have been previously identified, and the potential effect of the individual activities would not change for their conduct during RIMPAC. These ongoing activities have procedures and mitigations in place, and sensitive areas are understood and avoided. Mitigation measures developed during prior consultation have been adopted; subsequently, no activity conducted as a part of RIMPAC would present the potential for changes in the character or use of historic properties or cultural resources. Therefore, consistent with 36 CFR 800.4(a)(1) and 800.2(o), the U.S. Navy has determined that RIMPAC does not constitute an undertaking in the sense that totally new activities are planned. Instead, the RIMPAC undertaking is simply the coordination of ongoing training activities that have been combined into one exercise.

Section 7 Consultation with U.S. National Marine Fisheries Service and U.S. Fish and Wildlife Service

The ongoing activities of RIMPAC with the potential to affect a listed species or designated critical habitat or which were likely to jeopardize proposed species or adversely modify proposed habitat have been the subject of previous consultation or are presently being consulted on with both the National Marine Fisheries Service and the USFWS. Critical and proposed critical habitat is identified at all locations where the ongoing activities occur, and the avoidance and monitoring measures normally taken with the activity when conducted alone would be adopted by RIMPAC. All previously identified mitigations will be adopted (e.g. approved procedures for the prevention of introduction of alien species, surveys of activity related beach areas for turtles, turtle nesting, and monk seals, determining ocean areas clear of humpback whales prior to aggressive activities, and etc.) All ongoing activities that are conducted in the coastal zone and open ocean areas were the subject of consultation during the establishment of the Hawaiian Islands Humpback Whale National Marine Sanctuary. In addition, RIMPAC is conducted during periods of time when humpback whales are not present in Hawaii. The Hawaii Office of the National Marine Fisheries Service for Protected Species has reviewed the modeling data for determining the onset-TTS for marine mammals, and concurs with the recommended distance (radii) of the clearance areas associated with shallow water detonations (approximately 9 meters [30 feet]). Therefore, the U.S. Navy has determined that there is no reason to believe that RIMPAC would adversely affect listed species or their critical habitat and no formal consultation is required (Section 7(a)(3), Endangered Species Act, 1973).



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE

June 3, 2002

Jeffrey P. Luster, Commander in Chief, U.S. Pacific Fleet (N465)
CPF Environmental Counsel
250 Makalapa Dr.
Pearl Harbor, HI 96860
FAX (808) 474-5494

Re: Rim of the Pacific Exercise (RIMPAC) Programmatic Environmental Assessment (PEA)

Dear CDR Luster:

This responds to your letter (via email) dated May 30, 2002 regarding the Rim of the Pacific Exercise Programmatic Environmental Assessment (RIMPAC PEA). Our comments are provided in accordance with Section 7 of the Endangered Species Act (87 stat. 884 as amended; 16 U.S.C. 1531 et seq.).

The National Marine Fisheries Service (NMFS) has reviewed the PEA and recognizes the prior Section 7 informal consultations addressing the existing military activities covered by the subject PEA. The activities which may affect species under the jurisdiction of NMFS have been previously addressed in the consultation involving the "Report on Military Activities in Hawaiian Waters, April 1995". A comparison review of this document with the current RIMPAC PEA concluded that no significant differences exist.

Following technical discussions, various mitigation measures have been incorporated into the prior approved action to further reduce the likelihood of potential effects to listed species. These measures include:


- Surveying predetermined zones prior to detonation of charges to insure that no protected species are present
- Conducting protected species surveys in the activity area prior to exercises
- Conducting surveys of the activity area following completion of the exercise to identify impacts to protected species
- In the case of amphibious landing exercises, protected species surveys (especially for Hawaiian monk seals) should occur within one hour prior to landing
- NMFS recommends the response plan for seals sighted in landing zones include contacting NMFS Pacific Islands Area Office at (808) 753-0346



Provided the terms and conditions are adhered to during the course of the project activities as stated in the attached section 7 concurrence letter dated September 11, 1995 and the safety zone modeling is implemented for all detonation (which we assume are single charges, not line charges), NMFS concurs with the determination of the Navy that the activities are not likely to adversely affect listed species under the jurisdiction of NMFS. However, any future RIMPAC activities not covered by the PEA may require further section 7 consultation.

If you have any questions regarding this concurrence, please contact Margaret Akamine Dupree of this office at (808) 973-2935 ext 210.

Sincerely,



Rod McInnis
Acting Administrator, Southwest Region

cc: Randy Gallien, Chief, Environmental Policy, Compliance & Remediation
U.S. Army Space & Missile Defense Command, FAX (256)955-5074.

Rebecca Hommon, %RADM Robert T. Conway, Jr., USN Commander, Navy Region
Hawaii, FAX (808) 473-2783.

Leona Stevenson, NOAA Fisheries, Southwest Region, FAX (562) 980-4027



UNITED STATES DEPARTMENT OF COMMERCE
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NATIONAL MARINE FISHERIES SERVICE
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SEP 11 1995

F/SW033:ETN

RADM Gordon S. Holder
Commander
Naval Base Pearl Harbor
Box 110
Pearl Harbor, Hawaii 96860

Dear RADM Holder:

This is in reference to the Report on Military Activities in Hawaiian Waters (April 21, 1995) and the supplement provided to the National Marine Fisheries Service (NMFS) on August 14, 1995. We have reviewed the subject documents and concur that, based on available information, these activities are not likely to adversely affect humpback whales (Megaptera novaeangliae), Hawaiian monk seals (Monachus schauinslandi), green turtles (Chelonia mydas), hawksbill turtles (Eretmochelys imbricata) or leatherback turtles (Dermochelys coriacea) or designated critical habitat for Hawaiian monk seals, provided the following modifications to operating procedures are included in instructions for the various activities referenced below.

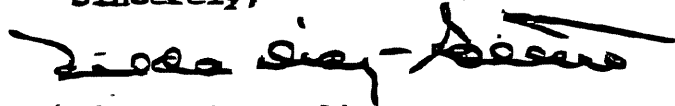
1. All mine warfare and mine countermeasure operations involving the use of explosive charges or live munitions must include safe zones for marine mammals, including humpback whales and sea turtles, that do not result in a take by physical or acoustic harassment. These zones should be calculated for each exercise based on charge type, charge weight, depth of water, and depth of the charge in the water column. Visual surveys by divers in the vicinity of the charge(s) and surveys by small boat(s) should be conducted in order to insure that safe range minimum distances are applied for each exercise. Where applicable and appropriate, acoustic monitoring for marine mammals should also be conducted. A representative from our Protected Species Division is available to assist the Navy in reviewing and/or developing these safe zones.



-3-

Please contact Mr. Eugene T. Nitta at 808-973-2987 or Fax 808-973-2941) should there be any questions concerning these conclusions.

Sincerely,

A handwritten signature in dark ink, appearing to read "Hilda Diaz-Soltero", with a stylized flourish at the end.

Hilda Diaz-Soltero
Regional Director

cc: F/SW033 - Nitta
CINCPACFLT (N465) - LCDR. C. Gaasch

6.0

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6.0 REFERENCES

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APPENDIX A
RIMPAC 2000 OPERATIONAL ORDER
ENVIRONMENTAL ANNEX

APPENDIX A

RIMPAC 2000 OPERATIONAL ORDER

ENVIRONMENTAL ANNEX

ANNEX L TO RIMPAC 2000 OPODER

ENVIRONMENTAL PROTECTION

References: (a) OPNAVINST 5090.1B, Environmental and Natural Resources Program Manual
(b) 50 C.F.R. 222.31, Approaching Humpback Whales in Hawaii
(c) NWP 4-11

RESPONSIBILITIES

1. CTF, BIF and MNF Commanders. Commanders are responsible for ensuring all subordinate units comply with this Annex and applicable environmental laws and regulations.
2. Commanding Officers of U.S. units.
 - a. Commanding Officers will cooperate with Federal, State and local government authorities in the prevention, control and abatement of environmental pollution. If requirements of an environmental law or regulation cannot be achieved for any reason, including because of operational considerations or insufficient resources, the Commanding Officer will report to the immediate superior in the chain of command and to the REC, Commander Navy Region (COMNAVREG) Hawaii.
 - b. Commanding Officers will be aware of all regulations regarding pollution control in the vicinity of the Hawaiian Islands, and recommend remedial measures when appropriate.
 - c. Commanding Officers will seek assistance from the Regional Environmental Coordinator as needed to ensure environmental compliance.
3. Commanding Officers of non-U.S. units. Non U.S.-units will comply with environmental requirements established by their competent authorities and are requested to comply with U.S. requirements discussed in this Annex. Contact Commander Navy Region Hawaii, the Regional Environmental Coordinator, if any difficulty is experienced in complying with this Annex.
4. Regional Environmental Coordinator (REC). The REC for the Hawaiian Islands, Commander Navy Region (COMNAVREG) Hawaii, can be reached at commercial

(808)471-1171 x229 (for commercial and AUTOVON), FAX (808)471-1160-. Outside normal working hours, call (808)577-6261 (pgr).

- a. The REC will assist commanders and commanding officers in environmental compliance.
- b. The REC will conduct oil spill notification and response exercises.
- c. The REC will operate the COMNAVREG Hawaii oil spill hotline at (808)471-4785 or during off-duty hours 574-5042 (pgr).

SHIPBOARD WASTE

5. Discharge Restrictions at Sea.

- a. A summary of discharge restrictions is contained in Appendix 1 of this Annex, summarized from Chapter 19 of reference (a). Immediately contact the REC, Commander Navy Region (COMNAVREG) Hawaii, for guidance if any difficulty is experienced in complying with these restrictions.
- b. In addition to the restrictions in Appendix 1, vessels are requested to attempt to avoid discharging any substance listed in Appendix 1 while operating within the 100 fathom isobath in the areas between the islands of Maui, Molokai, Lanai, and Kaho'olawe.

6. Disposal in Port.

- a. A summary of discharge restrictions for U.S. internal waters is contained in Appendix 1 of this Annex, summarized from Chapter 19 of reference (a). Immediately contact the REC, Commander Navy Region Hawaii, for guidance if any difficulty is experienced in complying with these restrictions. Units that require the offload of any wastes inport should so advise in their LOGREQ.
- b. Bilge water.
 - (1) Point of contact is Naval Station Pearl Harbor Port Operations Department at(808)473-2158 or 473-1168.
 - (2) Discharge and collection options, in descending order of preference:
 - (a) Discharge into vacuum truck or tank pierside.
 - (b) Discharge into Ship Waste Off-Load Barge (SWOB) or similar barge.
 - (c) If ship has installed shipboard oil-water separator with functioning oil content monitor and discharge does not exceed 15

parts per million of oil or cause an oily sheen, discharge processed water fraction overboard.

c. Sewage.

(1) Point of contact for sewage hookups is Naval Station Pearl Harbor Port Operations Department at (808)473-2158 or 473-1168. A welder will be available to manufacture flanges and fittings as needed for foreign vessels with fitting or connection size problems. Foreign ships should provide information concerning number, size, and location of fittings and any peculiarities (thread pattern, etc.).

(2) Ships with marine sanitation devices (MSD) or collection and holding tank (CHT) systems will use the ship waste water collection ashore system while berthed at Pearl Harbor.

(3) Note that discharge of sewage from ships in port or within 3 nautical miles of the Hawaiian shoreline is prohibited.

d. Oil or oily waste.

(1) Point of contact is Naval Station Pearl Harbor Port Operations Department at (808)473-2158 or 473-1168.

(2) See bilge water guidance for oil or oily waste in bilge water.

(3) Special handling and treatment is required for oily waste and used or waste oil that contains chemical emulsion agents (detergents , AFFF, etc.). Ensure the shoreside collection service is aware of the presence of these agents.

e. Trash and garbage.

(1) Point of contact is Naval Station Pearl Harbor Port Operations Department at (808)473-2158 or 473-1168. Place domestic/normal trash in green and brown receptacles located on the pier, subject to the following guidance.

(2) Foreign origin garbage (FOG). FOG is all foodstuffs, food waste, and their wrappers and containers procured outside the continental U.S. Regular garbage which comes into contact with FOG must be disposed of as FOG in green dumpster with white stripes.

(a) Minimization of in-port disposal of FOG is desired. See Appendix 1 of this Annex for acceptable methods of disposing of FOG at sea.

(b) All FOG must be double bagged in 30 gallon heavy-duty plastic bags and securely tied. Bags may not exceed 30 pounds. FOG must be placed in FOG dumpsters (dark green, usually 8 cubic yard containers, with diagonal white stripes). It is important to ensure that FOG is placed in the designated FOG dumpsters and not the general refuse dumpsters (usually 40 cubic yards). The ship will incur substantial fees if FOG is not properly disposed of and posting of a trained watch to ensure compliance is recommended.

(c) Federal Agricultural Inspectors board after the ship is berthed, and have authority to secure brows if necessary.

(3) Recycling. Recycling containers for cardboard, aluminum cans, and white paper will be located on Bravo 5 - 26, Mike 1 - 4, Sierra 1 - 21, and Yankee 1 - 3. Hotel piers will have recycling containers for aluminum cans only. Recycling will be unavailable at Ford Island locations. For additional assistance contact Naval Station Pearl Harbor Recycle at (808)473-2442.

(4) Medical or dental waste. Potentially infectious waste will be collected in autoclavable biohazard bags and autoclaved onboard. If capable, incinerate paper and cloth waste after autoclaving. Sharps must be collected in plastic autoclavable sharp containers. To avoid causing accidental puncture wounds and infectious aerosols, never recap, clip, cut, bend, or otherwise mutilate needles or syringes. All sharps shall be retained on board for proper disposal ashore. Unused sharps shall be disposed of ashore in the same manner as medical waste. If autoclave facilities are not available on board, or for general information regarding medical or dental waste requirements, contact Makalapa Medical Clinic at (808) 473-1510 x249/251.

f. Hazardous waste and hazardous materials.

(1) Ships not homeported at Pearl Harbor should contact Navy Public Works Center Code 152 at (808)471-1579 (PACFLT ships) or (808) 474-2065 (foreign ships) to request service and set up a job order number. Ships homeported at Pearl Harbor should already have pre-established job order numbers.

(2) Hazardous material turn-in point of contact for is the Fleet and Industrial Supply Center HAZMIN Center, (808)473-4140 or FAX 473-5726. Ships will be requested to complete a turn-in document and arrange for pre-inspection.

(3) Hazardous waste turn-in point of contact for is the Navy Public Works Center, (808)473-1491, or FAX 473-1419. Ships will be requested to complete a turn-in document and arrange for pre-inspection.

- (4) Information required in the turn-in document:
- (a) Command/Activity (for ships, include hull number).
 - (b) Location/Berth.
 - (c) Point of contact (HazMat/HazWaste Coordinator). Must be present at time of pre-inspection and pick-up.
 - (d) Contact phone number.
 - (e) Job Order Number (PWC JON).
 - (f) ESA Number (for emergency or other unusual service requests, this number can be reached by calling the PWC Service Desk at 474-8481).
 - (g) # block: Line Item Number for turn-in.
 - (h) Material description: description of the contents of the container and NSN, if applicable.
 - (i) Waste Process (process generating the waste).
 - (j) Virgin material block: is the item virgin material (Y) or is it possibly contaminated (N). Be as specific as possible.
 - (k) Suspected contaminants.
 - (l) Quantity.
 - (m) Size: size of containers to be turned in.
 - (n) Type: type of containers to be turned in.
 - (o) Fill in, sign and date originator's certification.

OIL OR HAZARDOUS SUBSTANCE SPILL PROCEDURES

7. Required Reporting. Immediate notification is vital to making decisions concerning mobilization of response assets.

a. Oil.

(1) An oil spill in U.S. waters or which has the potential to impact the U.S. shoreline must be reported. Any oil spill sufficient to cause a sheen on the water is a "reportable quantity."

(2) Any oil product discharged or released into a storm drain, or discharged on land in quantities greater than 25 gallons must be reported.

b. Hazardous substances. Any release of hazardous substances exceeding limits contained in the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) or Emergency Planning and Community Right-to Know Act (EPCRA) must be reported.

c. If any question concerning reportability of a spill or release exists, contact the Deputy Navy On-Scene Commander (NOSC) at (808) 471-4785 (office) or (808) 574-5042 (24 hr pgr).

8. Response by ship. If a spill or release occurs, take the following actions.
- a. Verbal notification.
- (1) Immediately (no more than 5 minutes from discovery) notify the following:
- (a) Federal Fire Department (FFD) dispatcher at 911 (24 hrs-excluding military housing), (808) 471-7117 (military housing), or 474-2222 (non-emergencies). Be prepared to provide details including the following: spill location, product spilled, estimated quantity spilled, characteristics of the spill (e.g. sheen), containment, and clean-up actions (b) The Deputy NOSC at (808) 471-4785 (office) or (808) 574-5042 (24 hr pgr). (c) COMNAVSURFGRU MIDPAC Environmental Officer (808) 473-1276.
- (b) If directed by the Deputy NOSC, notify the National Response Center (NRC) at 1-800-424-8802 (24 hrs), U.S. Coast Guard Marine Safety Office at (808) 541-8260 (24 hrs), State Emergency Response Commission (SERC) at (808) 247-2191 (24 hrs), and Local Emergency Planning Committee (LEPC) at (808) 523-4121 (non-emergencies)/911 (24 hrs).
- (c) If further information or assistance is required regarding oil and hazardous substance spills, contact the Deputy NOSC at (808) 471-4785 (office) or (808) 574-5042 (24 hr pgr).
- b. Response. Begin safe and appropriate response actions to stop, contain, and clean up the spill. Request assistance from the Federal Fire Department (FFD) dispatcher at 911 (24 hrs-excluding military housing), (808) 471-7117 (military housing), or 474-2222 (non-emergencies) if the spill exceeds the ship's response capability.
- c. Message.
- (1) U.S. Navy ships shall, within 24 hours, prepare and release a message in accordance with OPNAVINST 5090.1B, Appendix H and I.
- (2) Foreign ships. COMNAVREGHI/NAVSTA Pearl Harbor will prepare and release a message in accordance with OPNAVINST 5090.1B, Appendix H and I.
9. Additional Information.
- a. COMNAVBASEPEARLINST 5090.1D contains information on oil spill response actions.

b. SOPA Instruction 5000.1E describes requirements and limitations on fuel operations in Pearl Harbor.

10. BALLAST WATER Ballast water will be offloaded outside of 12 miles from shore and clean sea water taken on and discharged two times prior to entry within 12 nautical miles from shore. The actions will be recorded in the ship's engineering log, including geographic position and amount of ballast water taken on.

11. AIR POLLUTION CONTROLS Ships in port will make every effort to minimize the release of black smoke in Pearl Harbor. In the event that an accidental release of black smoke occurs for more than 6 minutes while berthed (for example, due to operational problems with boilers), notify COMNAVREG HI (808)471-1171 x208, or off-duty hours 471-8044. Be prepared to provide sufficient information to answer inquiries from external organizations and the public.

MARINE SPECIES PROTECTION

12. All Marine Mammals. The Marine Mammal Protection Act prohibits "taking" of marine mammals. This term is broadly defined to include actual or attempted harassment, harm, pursuit, hunting, shooting, wounding, killing, trapping, capture, or collection and any habitat destruction that could result in extinction of a species. This is an absolute moratorium.

13. Use of Explosives.

a. Endangered marine species, including the humpback whale, Hawaiian monk seal, green turtle, hawksbill turtle, and leatherback turtle, are present in the waters and along the shorelines of the Hawaiian Islands. To ensure protection of these animals, all shoreline and water areas which may be affected by the detonation of explosive charges or the use of live munitions must be determined to be clear of marine species prior to detonation or discharge.

b. Commands planning or sponsoring any type of underwater detonations, including the dropping of live depth charges or other live underwater ordnance must include COMNAVREG HI NOOL/N3 as an info addressee on all requests for underwater detonations. See COMNAVSURFPACINST 3120.8D.

14. Reporting.

a. All sightings of turtles, whales, or seals shall be logged in the ship log during the exercise. At the completion of the exercise, each ship will report all sightings by routine precedence message to: COMNAVREG HAWAII PEARL HARBOR HI//NOOL/N3//. Negative report is required. The message should advise when, where and how many of each species were sighted.

b. If any adverse interaction occurs, report the incident by immediate precedence message to COMNAVREG HAWAII PEARL HARBOR HI//NOOL/N3//.

15. Humpback whales.

a. Although humpback whales generally depart the Hawaiian area in mid-May, commanding officers must ensure that watch officers are familiar with the following guidance contained in reference (b). When operating within 200 nautical miles of the Hawaiian Islands, it is illegal for any vessel to approach within 100 yards or any aircraft to operate within 1,000 feet of a humpback whale. The criminal penalty for non-compliance is a fine of up to \$25,000 and/or up to six months in jail. Whales are naturally inquisitive and in the past have initiated close encounters despite the best efforts to avoid them.

b. A close encounter (within 100 yards for vessels or 1,000 feet for aircraft) requires special reporting. Make log entries to document actions taken to avoid or mitigate close encounters. This record could prove useful to establish a pattern of good faith efforts to avoid collision, should an incident later occur. FAX copies of log entries to COMNAVREG HI at (808) 474-8755, attention NOOL. A close encounter which could generate public or press interest requires an OPREP-3 NAVY BLUE or Unit SITREP. Include the following information: date, time and position; speed and direction of vessel; weather conditions, visibility and sea state; and detailed description of whale (e.g., length, color, other distinguishing features).

c. Collision requires submission of details via OPREP-3 NAVY BLUE. Include as action addressee COMNAVREG HAWAII PEARL HARBOR HI//NO1K/NOOL// Include as info addressees CINCPACFLT PEARL HARBOR HI//N465// and CNO WASHINGTON DC//N45//. Include the following information: date, time and position; speed and direction of vessel; weather conditions, visibility and sea state; and detailed description of whale (e.g., length, color, other distinguishing features).

BROWN TREE SNAKE CONTROL

16. Pre-entry Inspection. Introduction of any animal into Hawaii without permission of the State Department of Agriculture is prohibited. Commanding officers of all vessels shall, prior to arrival in Hawaii, insure that all stores originating from Australia and Guam are inspected for the brown tree snake. This inspection may be accomplished during on-loading of such stores or while underway. Inspection records may be provided upon arrival in Hawaii to Department of Agriculture inspectors, who will inspect ships at berth for compliance with State animal quarantine laws. This inspection will not interfere with the granting of liberty.

17. Post-arrival action. If a snake is sighted aboard ship, aircraft, or during training exercises on land, restrain, contain, or immobilize the snake until appropriate authorities arrive. Immediately notify NAVSTA Pearl Harbor Security Police of all snake sightings at (808)471-7114 (24 hours).

18. For information and photos regarding the brown tree snake, contact Mr. Randy Miyashiro, COMNAVREG Hawaii at (808) 471-1171 x233.

APPENDIX 1 TO ANNEX L TO RIMPAC 2000 OPORDER

SUMMARY OF DISCHARGE RESTRICTIONS

DEFINITIONS

Sewage (Black Water). Human body waste and the wastes from toilets and other receptacles intended to receive or retain body wastes.

Graywater. Discarded water from deck drains, lavatories, showers, dishwashers, laundries, and garbage grinders, as well as discarded water from shipboard medical facilities. This does not include industrial waste or human body wastes.

Oily Waste. Oil is any petroleum-based fluid or semi-solid, including crude oil, all liquid fuels (gasoline, kerosene, diesel and all light and heavy fuel oils), lube oil, all waste oils, oil sludge, oil refuse, and synthetic-based lubricating and transmission products. A sheen is an iridescent appearance on the surface of the water.

Garbage. All kinds of victuals and domestic and operational waste generated during the normal operations of a ship. 'Garbage' encompasses all forms of shipboard solid waste, including plastics, food waste, and dry waste such as paper, cardboard, and wood which have traditionally been referred to as "trash." Foreign source garbage includes goods, food wastes, wrappers, containers, and disposable materials originating in any non-U.S. country (excluding Canada) or Puerto Rico, U.S. Virgin Islands, American Samoa, Guam and the Trust Territories of the Pacific.

Pulped or Comminuted Garbage. Pulped, ground, or comminuted garbage or trash capable of passing through a screen with openings no greater than 25 millimeters (0.98 inches).

Hazardous Material. Any material that, because of its quantity, concentration, or physical, chemical, or infectious characteristics, may pose a substantial hazard to human health or the environment.

Medical Waste. Any waste generated during patient diagnosis, treatment or immunization. Medical waste may be divided into two categories, infectious waste and non-infectious waste.

TABLES CONTAINING SUMMARY OF DISCHARGE RESTRICTIONS. See following pages.

AREA	SEWAGE ("BLACK WATER")	GRAYWATER	OILY WASTE
US Internal Waters & Territorial Seas (0-3 nm)	No discharge.	If equipped to collect graywater in CHT system, collect and pump to shore when pierside. If no collection capability exists, direct discharge permitted.	No Sheen. If equipped with OCM, discharge < 15 ppm oil. (1)
US Contiguous Zone (3-12 nm)	Direct discharge permitted.	Direct discharge permitted.	No sheen. If equipped with OCM, discharge < 15 ppm oil. (1)
12-25 nm	Direct discharge permitted.	Direct discharge permitted.	If equipped with OCM, discharge < 15 ppm oil. Ships with OWS but no OCM must process all machinery space bilge water through OWS. (2) (3)
> 25 nm	Direct discharge permitted.	Direct discharge permitted.	Same as 12-25 nm. (2) (3)
> 50 nm & High Seas	Direct discharge permitted.	Direct discharge permitted.	Same as 12-25 nm. (2) (3)
Comments	Direct discharge allowed within 3 nm under emergency conditions.		State/local rules may vary; check SOPA regulations. Submarines: Direct oily waste to WOCT; when full and > 50 nm, pump off bottom water phase.

Notes:
 OWS - Oil-Water Separator (1) If operating properly, OWS discharge will routinely be less than 15 ppm.
 OCM - Oil Content Monitor (2) Ships without OWS systems must retain oily waste for shore disposal. If operating conditions require
 WOCT - Waste Oil Collecting Tank at-sea disposal, minimal discharge is permitted beyond 50 nm from nearest land.
 SOPA - Senior Officer Present Afloat (3) If equipped with OWS and OCM and operating conditions prevent achieving less than 15 ppm, limit discharge to less than 100 ppm.

AREA	GARBAGE (NON-PLASTICS)	GARBAGE (PLASTICS) (NON-FOOD CONTAMINATED)	GARBAGE (PLASTICS) (FOOD-CONTAMINATED)
US Internal Waters & Territorial Seas (0-3 nm)	No discharge.	No discharge.	No discharge.
US Contiguous Zone (3-25 nm)	Pulped or comminuted garbage may be discharged. Submarines see note (4)	No discharge.	No discharge.
> 25 nm	Direct discharge permitted.	No discharge.	No discharge.
> 50 nm & High Seas	Direct discharge permitted.	Retain last 20 days before return to port. Discharge if necessary.	Retain last 3 days before return to port. Discharge if necessary.
Comments	Garbage discharged should be processed to eliminate floating marine debris. Retain surplus material for shore disposal.	Record-keeping requirements exist for at-sea discharge. When plastics processor installed: No discharge.	Record-keeping requirements for at-sea discharge. When plastics processor installed: No discharge.

AREA	HAZARDOUS WASTES	MEDICAL WASTES (INFECTIOUS & SHARPS)
US Internal Waters & Territorial Seas (0-3 nm)	No discharge.	Steam sterilize, store, and transfer ashore. No discharges.
US Contiguous Zone (3-12 nm)	No discharge.	Steam sterilize, store, and transfer ashore. No discharges.
12-25 nm	No discharge.	Steam sterilize, store, and transfer ashore. No discharges.
> 25 nm	No discharge.	Steam sterilize, store, and transfer ashore. No discharges.
> 50 nm & High Seas	No discharge.	If health and safety are threatened, steam sterilize waste, package and weight for negative buoyancy, log, and discharge. No discharge of sharps permitted.
Comments		Dispose of all sharps ashore. Do not incinerate plastic, wet materials. Steam sterilization requirement not applicable to submarines. Other noninfectious waste may be disposed of as garbage and does not require steam sterilization.

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APPENDIX B

THREATENED AND ENDANGERED SPECIES LISTS

APPENDIX B THREATENED AND ENDANGERED SPECIES LISTS

Table B-1: Threatened and Endangered Terrestrial Species at PMRF

Scientific Name	Common Name (Hawaiian Name)	Federal Status
Plants		
<i>Panicum niihauense</i>	(Lau'ehū)	E
<i>Sesbania tomentosa</i>	(Ohai)	E
Birds		
<i>Anas wyvilliana</i>	Hawaiian duck (Koloa-maoli)	E
<i>Asio flammeus sandwichensis</i>	Hawaiian short-eared owl (Pueo)	SOC
<i>Fulica americana alai</i>	American/Hawaiian Coot ('Alae-ke'oke'o)	E
<i>Gallinula chloropus sandvicensis</i>	Hawaiian Gallinule/common moorhen ('Alae-'ula)	E
<i>Himantopus mexicanus knudseni</i>	Hawaiian black-necked stilt (Ae'o)	E
<i>Pterodroma phaeopygia sandwichense</i>	Hawaiian dark-rumped petrel ('Ua'u)	E
<i>Puffinus auricularis newelli</i>	Newell's shearwater (A'o)	T
Mammals		
<i>Chelonia mydas</i>	Green sea turtle	T (E)
<i>Lasiurus cinereus semotus</i>	Hawaiian hoary bat (Ope'ape'a)	E
<i>Monachus schauinslandi</i>	Hawaiian monk seal	E

Source: U.S. Fish and Wildlife Service, 1999a.

Key to Federal Status:

E = Endangered

SOC = Species of Concern

T = Threatened

Table B-2: Threatened and Endangered Terrestrial Wildlife at Pearl Harbor

Scientific Name	Common Name (Hawaiian Name)	Federal Status
Birds		
<i>Anas wyvilliana</i>	Hawaiian duck (Koloa-maoli)	E
<i>Asio flammeus sandwichensis</i>	Hawaiian short-eared owl (Pueo)	SOC
<i>Fulica americana alai</i>	American/Hawaiian Coot ('Alae-ke'oke'o)	E
<i>Gallinula chloropus sandvicensis</i>	Hawaiian Gallinule/common moorhen ('Alae-'ula)	E
<i>Himantopus mexicanus knudseni</i>	Hawaiian black-necked stilt (Ae'o)	E
Mammals		
<i>Chelonia mydas</i>	Green sea turtle	T (E)
<i>Monachus schauinslandi</i>	Hawaiian monk seal	E

Source: U.S. Fish and Wildlife Service, 1999b.

Key to Federal Status:

E = Endangered

SOC = Species of Concern

T = Threatened

Table B-3: Threatened and Endangered Vegetation at Kahuku Training Area

Scientific Name	Common Name	Federal Status
<i>Adenophorus periens</i>	No common name	E
<i>Botrychium subbifoliatum</i>	Makou	SOC
<i>Chamaesyce rockii</i>	‘Akoko, koko, kokomalei	E
<i>Cyanea grimesiana</i> Ssp. <i>grimesiana</i>	‘Oha, haha, ‘ohawai	E
<i>Cyanea koolauensis</i>	‘Oha, haha, ‘ohawai	E
<i>Cyanea lanceolata</i> Ssp. <i>calycina</i>	‘Oha, haha, ‘ohawai	SOC
<i>Cyanea longiflora</i>	‘Oha, haha, ‘ohawai	E
<i>Eugenia koolauensis</i>	Nioi	E
<i>Eurya sandwicensis</i>	Anini	SOC
<i>Gardenia mannii</i>	Nanu, na‘u	E
<i>Hedyotis fluviatilis</i>	No common name	SOC
<i>Hesperomannia arborescens</i>	No common name	E
<i>Lindsaea repens</i> var. <i>macraeana</i>	No common name	SOC
<i>Nesoluma polynesianum</i>	Keahi	SOC
<i>Phyllostegia hirsuta</i>	No common name	E
<i>Platydesma cornuta</i>	No common name	SOC
<i>Pteralyxia macrocarpe</i>	Kaulu	SOC
<i>Tetraplasandra gymnocarpa</i>	‘Ohe‘ohe	E

Source: U.S. Army Garrison, Hawaii, and U.S. Army Corps of Engineers, 1997a.

Key to Federal Status:

E = Endangered

SOC = Species of Concern

Table B-4: Threatened and Endangered Terrestrial Wildlife at Kahuku Training Area

Scientific Name	Common Name (Hawaiian Name)	Federal Status
Snails		
<i>Achatinella curta</i>	Oahu Tree Snail (Pupu Kuahiwi, Pupu Kanioe, Kahuli)	E
<i>Achatinella dimorpha</i>	Oahu Tree Snail (Pupu Kuahiwi, Pupu Kanioe, Kahuli)	E
<i>Achatinella sowerbyana</i>	Oahu Tree Snail (Pupu Kuahiwi, Pupu Kanioe, Kahuli)	E
<i>Achatinella valida</i>	Oahu Tree Snail (Pupu Kuahiwi, Pupu Kanioe, Kahuli)	E
<i>Auriculella perpusilla</i>	Achatinellid land snail	SOC
<i>Auriculella pulchra</i>	Achatinellid land snail	SOC
Birds		
<i>Asio flammeus sandwichensis</i>	Hawaiian Short-eared Owl (Pueo)	SOC
<i>Chasiempis sandwichensis</i>	(Oahu ‘Elepaio)	E
<i>ibidis</i>		

Source: U.S. Army Garrison, Hawaii, and U.S. Army Corps of Engineers, 1997a.

Key to Federal Status:

E = Endangered

SOC = Species of Concern

Table B-5: Threatened and Endangered Vegetation at Makua Military Reservation

Scientific Name	Common Name (Hawaiian Name)	Federal Status
<i>Alectryon macrococcus</i> var. <i>macrococcus</i>	(‘Ala’alahua, mahoe)	E
<i>Alsinidendron obovatum</i>		E
<i>Bobea timonioides</i>	(‘Ahakea)	SOC
<i>Bonamia menziesii</i>		E
<i>Caesalpinia kavaensis</i>	(Uhiuhi)	E
<i>Capparis sandwichiana</i>	(Maiapilo, pua pilo)	SOC
<i>Cenchrus agrimonioides</i> var. <i>agrimonioides</i>	(Kamanomano)	E
<i>Ctenitis squamigera</i>	(Pauoa)	E
<i>Cyanea superba</i> ssp. <i>superba</i>	(‘Oha, haha, ‘ohawai)	E
<i>Delissea subcordata</i>	(‘Oha, haha, ‘ohawai)	E
<i>Diellia falcata</i>		E
<i>Dubautia herbstobatae</i>	(Na’ena’e)	E
<i>Dubautia sherffiana</i>	(Na’ena’e)	SOC
<i>Euphorbia haeleeleana</i>		E
<i>Exocarpos gaudichaudii</i>	(Heau)	SOC
<i>Flueggea neowawraea</i>	(Mehamehame)	E
<i>Hedyotis parvula</i>		E
<i>Korthalsella degeneri</i>	(Hulumoa, kaumahana)	SOC
<i>Labordia kaalae</i>	Kamakahala	SOC
<i>Lepidium arbuscula</i>	(‘Anaunau, naunau, kunana)	E
<i>Lipochaeta tenuifolia</i>	(Nehe)	E
<i>Lobelia niihauensis</i>	(‘Oha, haha, ‘ohawai)	E
<i>Melicope makahae</i>	(Alani)	SOC
<i>Neraudia angulata</i> var. <i>angulata</i>	(Ma’aloe, ma’oloe, ‘oloe)	E
<i>Neraudia angulata</i> var. <i>dentata</i>	(Ma’aloe, ma’oloe, ‘oloe)	E
<i>Neraudia melastomifolia</i>	(Ma’aloe, ma’oloe, ‘oloe)	E
<i>Nesoluma polynesicum</i>	(Keahi)	SOC
<i>Nothoestrum latifolium</i>	(‘Aiea)	SOC
<i>Nototrichium humile</i>	(Kulu’I)	E
<i>Plantago princeps</i> var. <i>princeps</i>	(Ale)	E
<i>Platydesma cornuta</i> var. <i>decurrens</i>	(Pilo kea)	SOC
<i>Pleomele forbesii</i>	(Halepepe)	SOC
<i>Pritchardia kaalae</i>	(Loulou)	E
<i>Pteralyxia macrocarpa</i>	(Kaulu)	SOC
<i>Sanicula maritima</i>		E

**Table B-5: Threatened and Endangered Vegetation at Makua Military Reservation
(Continued)**

Scientific Name	Common Name (Hawaiian Name)	Federal Status
<i>Schiedea hookeri</i> A. Gray		E
<i>Schiedea ligustrina</i> Cham. and Schlechtend.		SOC
<i>Schiedea mannii</i>		SOC
<i>Schiedea nutallii</i> var. <i>nutallii</i>		E
<i>Schiedea pubescens</i>		SOC
<i>Silene lanceolata</i>		E
<i>Spermolepis hawaiiensis</i>		E
<i>Tetramolopium filiforme</i> var. <i>filiforme</i>		E
<i>Tetramolopium filiforme</i> var. <i>polyphyllum</i>		E
<i>Tetramolopium lepidotum</i> ssp. <i>lepidotum</i>		E
<i>Viola chamissoniana</i> ssp. <i>Chamissoniana</i>	(Pamakani)	E

Source: U.S. Army Garrison, Hawaii, and U.S. Army Corps of Engineers, 1997a.

Key to Federal Status:

E	=	Endangered	Taxa formally listed as endangered
SOC	=	Species of Concern	Official listing for taxa that the U.S. Fish and Wildlife Service remains concerned about and continues to monitor, but which receive no protection under the Endangered Species Act of 1973, as amended

Table B-6: Threatened and Endangered Wildlife at Makua Military Reservation

Scientific Name	Common Name (Hawaiian Name)	Federal Status
Snails		
<i>Achatinella mustelina</i>	Oahu Tree Snail (Pupu Kuahiwi, Pupu Kanioe, Kahuli)	E
<i>Amastra rubens</i>	Amastrid land snail	SOC
<i>Auriculella ambusta</i>	Achatinellid land snail	SOC
<i>Auriculella</i> sp. aff. <i>Castanea</i>	Achatinellid land snail	SOC
<i>Auriculella</i> sp. aff. <i>Perpusilla</i>	Achatinellid land snail	SOC
<i>Cookeconcha</i> sp.	Endodontid land snail	SOC
<i>Leptachatina</i> sp.	Amastrid land snail	SOC
<i>Partulina dubia</i>	Achatinellid land snail	SOC
<i>Pleuropoma sandwichiensis</i>	Helicinid land snail	SOC

Source: U.S. Army Garrison, Hawaii, and U.S. Army Corps of Engineers, 1997a.

Key to Federal Status:

E	=	Endangered	Taxa formally listed as endangered
SOC	=	Species of Concern	Official listing for taxa that the U.S. Fish and Wildlife Service remains concerned about and continues to monitor, but which receive no protection under the Endangered Species Act of 1973, as amended

Table B-7: Threatened and Endangered Vegetation at Dillingham Military Reservation

Scientific Name	Common Name	Federal Status
<i>Bobea sandwicensis</i>	`ahakea	SOC
<i>Cyperus trachysanthos</i>		E
<i>Hibiscus brackenridgei</i> ssp. <i>Mokuleianus</i>	Ma`o hau hele	E
<i>Hibiscus kokio</i> ssp. <i>Kokio</i>	Koki`o `ula`ula	SOC
<i>Lepidium bidentatum</i> var. <i>o-waihiense</i>	`anaunau, naunau, kunana	SOC
<i>Lipochaeta remyi</i>	Nehe	SOC
<i>Nototrichium humile</i>	Kulu`I	E
<i>Schiedea kealiae</i>		E

Source: U.S. Army Garrison, Hawaii, and U.S. Army Corps of Engineers, 1997a.

Key to Federal Status:

Endangered (E) Taxa formally listed as endangered
Species of Concern (SOC) Official listing for taxa that the U.S. Fish and Wildlife Service remains concerned about
and continues to monitor, but which receive no protection under the Endangered Species Act of 1973, as amended

Table B-8: Threatened and Endangered Vegetation at Pohakuloa Training Area

Scientific Name	Common Name (Hawaiian Name)	Federal Status
<i>Asplenium fragile</i> var. <i>insulare</i>	Fragile fern	E
<i>Chamaesyce olowaluana</i>	Maui milk tree ('Akoko, kokomalei)	SOC
<i>Cystopteris douglasii</i>	No common name	SOC
<i>Eragrostis deflexa</i>	Bent love grass	SOC
<i>Exocarpos gaudichaudii</i>	Whisk broom sandalwood (Heau)	SOC
<i>Festuca hawaiiensis</i>	Hawaiian fescue	SOC
<i>Haplostachys haplostachya</i>	Hawaiian mint (Honohono)	E
<i>Hedyotis coriacea</i>	Leather leaf sweet ear (Kio'ele)	E
<i>Melicope hawaiiensis</i>	(Alani)	SOC
<i>Neraudia ovata</i>	Spotted nettle bush (Ma'aloa, ma'oloa)	E
<i>Portulaca sclerocarpa</i>	Hard-fruit purslane ('Ihi)	E
<i>Portulaca villosa</i>	Hairy purslane	SOC
<i>Silene hawaiiensis</i>	Hawaiian catchfly	T
<i>Silene lanceolata</i>	Lanceleaf catchfly	E
<i>Solanum incompletum</i>	(Popolo ku mai)	E
<i>Spermolepis hawaiiensis</i>	Hawaiian parsley	E
<i>Stenogyne angustifolia</i>	Creeping mint	E
<i>Tetramolopium arenarium</i>	(Mauna Kea pamakani)	E
<i>Tetramolopium</i> sp.	Tooth leaf pamakani	E
<i>Tetramolopium humile</i> ssp. <i>humile</i> var. <i>sublaeve</i>	Sub-alpine pamakani	SOC
<i>Zanthoxylum hawaiiense</i>	Hawaiian yellow wood (Hea'e, a'e)	E

Source: U.S. Army Garrison, Hawaii, and U.S. Army Corps of Engineers, 1997b.

Key to Federal Status:

E = Endangered
SOC = Species of Concern
T = Threatened

Table B-9: Threatened and Endangered Wildlife at Pohakuloa Training Area

Scientific Name	Common Name (Hawaiian Name)	Federal Status
Snails		
<i>Leptachatina lepidata</i>	Amastrid land snail	SOC
Birds		
<i>Branta sandvicensis</i>	Hawaiian goose (Nene)	E
<i>Buteo solitarius</i>	Hawaiian hawk ('Io)	E
<i>Corvus hawaiiensis</i>	Hawaiian crow ('Alala)	E
<i>Hemignathus munroi</i>	('Akiapola'au)	E
<i>Loxiodes bailleui</i>	(Palila)	E
<i>Pterodroma phaeopygia sandwichensis</i>	Hawaiian dark-rumped petrel ('Ua'u)	E
Mammals		
<i>Lasiurus cinereus semotus</i>	Hawaiian hoary bat ('Ope'ape'a)	E

Source: U.S. Army Garrison, Hawaii, and U.S. Army Corps of Engineers, 1997b.

Key to Federal Status:

E = Endangered

SOC = Species of Concern

Table B-10: Threatened and Endangered Wildlife at Bellows Air Force Station

Scientific Name	Common Name	Federal Status
<i>Asio flammeus sandwichensis</i>	Short-eared owl (Pueo)	SOC
<i>Himantopus mexicanus knudseni</i>	Black-necked stilt (Ae'o)	E
<i>Anas wyvilliana</i>	Hawaiian duck (Koloa)	E
<i>Fulica alai</i>	Hawaiian coot ('Alae'ula Ke'oke'o)	E
<i>Gallinula chloropus sandvicensis</i>	Common moorhen ('Alae'ula)	E
<i>Chelonia mydas</i>	Green sea turtle	T
<i>Eretmochelys imbricata</i>	Hawksbill turtle	E
<i>Monachus schauinslandi</i>	Hawaiian monk seal	E

Source: U.S. Pacific Command, 1995a.

Key to Federal Status:

E = Endangered

SOC = Species of Concern

T = Threatened

**Table B-11: Threatened and Endangered Marine Mammals and Sea Turtle Species
in Open Ocean Areas**

Scientific Name	Common Name	Federal (State) Status	Time Period Within Area	Mating/Calving Period
Marine Mammals¹				
<i>Monachus schauinslandi</i>	Hawaiian Monk Seal	E (E)	Year Round Nonmigratory	June-July/April- May
<i>Balaenoptera musculus</i>	Blue Whale	E (E)	Year Round	Winter
<i>Balaenoptera physolus</i>	Fin Whale	E (E)	Year Round	November/ February
<i>Megaptera novaeangliae</i>	Humpback Whale	E (E)	November to April	Winter
<i>Balaenoptera borealis</i>	Sei Whale	E (E)	Fall & Winter	October/March
<i>Physeter macrocephalus</i>	Sperm Whale	E (E)	Year Round	April/August
Sea Turtles				Mating/Nesting Period
<i>Eretmochelys imbricata</i>	Hawksbill Sea Turtle	E (E)	Year Round	Early Spring/Fall
<i>Chelonia mydas</i>	Green Sea Turtle	T (E)	Year Round in Warm Water	Early Spring/Fall
<i>Caretta caretta</i>	Loggerhead Sea Turtle	T (T)	Year Round in Warm Water, Visitor	Late Winter/ Early Spring

Source: Pacific Missile Range Facility, Barking Sands, 1998; U.S. Fish and Wildlife Service, 1999b.

¹ All marine mammals are protected under the Marine Mammals Protection Act.

Key to Federal Status:
E = Endangered
T = Threatened

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APPENDIX C

DISTRIBUTION LIST

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DISTRIBUTION LIST

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APPENDIX D

GLOSSARY OF TERMS

APPENDIX D

GLOSSARY OF TERMS

Air Traffic Control—a service operated by appropriate authority to promote the safe, orderly, and expeditious flow of air traffic.

Airfield—usually an active and/or inactive military airfield, or infrequently used landing strip, with or without a hard surface.

Airport—usually an active airport with hard-surface runways of 915 meters (3,000 feet) or more, with Federal Aviation Administration approved instrument approach procedures regardless of runway length or composition. An airport may or may not have a control tower. Airports may be public or private.

Airspace—the space lying above the earth or above a certain land or water area (such as the Pacific Ocean); more specifically, the space lying above a nation and coming under its jurisdiction.

Aquifer—a subsurface formation, group of formations, or part of a formation (such as a huge, underground reservoir) that contains sufficient saturated permeable material to conduct groundwater and yield economical quantities of water to wells and springs.

A-weighted Sound Level (dBA)—a number representing the sound level which is frequency-weighted according to a prescribed frequency response established by the American National Standards Institute (ANSI S1.4-19711) and accounts for the response of the human ear.

Cetacea—any member of the order of animals commonly called whales (toothed and untoothed), which includes dolphins.

Coastal Zone—a region beyond the littoral zone occupying the area near the coastline in depths of water less than 50 meters (538 feet). The coastal zone typically extends from the high tide mark on the land to the gently sloping, relatively shallow edge of the continental shelf. The sharp increase in water depth at the edge of the continental shelf separates the coastal zone from the offshore zone. Although comprising less than 10 percent of the ocean's area, this zone contains 90 percent of all marine species and is the site of most large commercial marine fisheries. This may differ from the definition of the term "coastal zone" in the State Coastal Zone Management Program (Hawaii Revised Statutes Chapter 205 A).

Community—an ecological collection of different plant and animal populations within a given area or zone.

Controlled Airspace—airspace of defined dimensions within which air traffic control service is provided to Instrument Flight Rules flights and to Visual Flight Rules flights in accordance with the airspace classification. Controlled airspace is divided into five classes, dependent upon location, use, and degree of control: Class A, B, C, D, and E.

Cultural Resource Component—a location or element within a settlement or subsistence system. Archaeological sites may contain several components that reflect the use of the locality by different groups in different time periods.

Danger Zone—at the Pacific Missile Range Facility (PMRF), an offshore area to protect submerged cables that is designated in accordance with U.S. Army Corps of Engineers regulations into which entry by any craft is prohibited except with the permission of the Commanding Officer, PMRF. See Code of Federal Regulations, Title 33, Parts 204 to 225a.

Decibel (dB)—the accepted standard unit of measure for sound pressure levels. Due to the extremely large range of measurable sound pressures, decibels are expressed in a logarithmic scale.

Easement—a right of privilege (agreement) that a person or organization may have over another's property; an interest in land owned by another that entitles the holder of the easement to a specific limited use.

Ecosystem—all the living organisms in a given environment with the associated non-living factors.

Effects—a change in an attribute, which can be caused by a variety of events, including those that result from program attributes acting on the resource attribute (direct effect); those that do not result directly from the action or from the attributes of other resources acting on the attribute being studied (indirect effect); those that result from attributes of other programs or other attributes that change because of other programs (cumulative effects); and those that result from natural causes (for example, seasonal change).

Endangered Species—an organism threatened with extinction throughout all or a significant portion of its range.

Endemic—plants or animals that are native to an area or limited to a certain region.

Exotic—not native to an area.

Explosive Ordnance Disposal (EOD)—the process of recovering and neutralizing domestic and foreign conventional, nuclear, and chemical/biological ordnance and improvised explosive devices; a procedure in Explosive Ordnance Management.

Explosive Safety Quantity–Distance (ESQD)—the amount of explosive materials and distance separation relationships providing defined types of protection. These relationships are based on levels of risk considered acceptable for the stipulated exposures.

Fathom—a unit of length equal to 1.8 meters (6 feet); used to measure the depth of water.

Feral—having escaped from domestication and become wild.

Flight Termination—action taken in certain post-launch situations, such as a missile veering off of its predicted flight corridor; usually accomplished by stopping the propulsive thrust of a rocket motor via explosive charge. At this point, the missile continues along its current path, falling to earth under gravitational influence.

Free Flight—a joint initiative of the aviation industry and the Federal Aviation Administration to allow aircraft to take advantage of advanced satellite voice and data communication to provide faster and more reliable transmission to enable reductions in vertical, lateral, and longitudinal separation of aircraft, more direct flights and tracks, and faster altitude clearance. It will allow pilots, whenever practicable, to choose their own route and file a flight plan that follows the most efficient and economical route, rather than following the published preferred Instrument Flight Rules routes.

Ground Hazard Area—the land area contained in an arc within which all debris from a terminated launch will fall. For example, the arc for a Strategic Target System launch is described such that the radius is approximately 3,048 meters (10,000 feet) to the northeast, 2,774 meters (9,100 feet) to the east, and 2,743 meters (9,000 feet) to the south of the launch point. For the Vandal launch, the arc is 1,829 meters (6,000 feet).

Hazardous Material (HAZMAT)—generally, a substance or mixture of substances capable of either causing or significantly contributing to an increase in mortality or an increase in serious irreversible or incapacitating reversible illness; it may pose a threat or a substantial present or potential risk to human health or the environment. HAZMAT use is regulated by the U.S. Department of Transportation, the Occupational Safety and Health Administration, and the Emergency Right-to-Know Act.

Instrument Flight Rules—rules governing the procedures for conducting instrument flight; a term used by pilots and controllers to indicate type of flight plan.

Mitigation—a method or action to reduce or eliminate adverse environmental impacts. Such measures may avoid impacts by not taking a certain action or parts of an action; minimize impacts by limiting the magnitude of an action; rectify impacts by restoration measures; reduce or eliminate impacts over time by preservation or maintenance measures during the action; or compensate for impacts by replacing or providing substitute resources or environments.

National Ambient Air Quality Standards (NAAQS)—as set by the U.S. Environmental Protection Agency under Section 109 of the Clean Air Act, nationwide standards for limiting concentrations of certain widespread airborne pollutants to protect public health with an adequate margin of safety (primary standards) and to protect public welfare, including plant and animal life, visibility and materials (secondary standards). Currently, six pollutants are regulated by primary and secondary NAAQS: carbon monoxide, lead, nitrogen dioxide, ozone, particulate matter, and sulfur dioxide (see Criteria Pollutants).

National Register Eligible Property—property that has been determined eligible for the National Register of Historic Places listing by the Secretary of the Interior, or one that has not yet gone through the formal eligibility determination process but which meets the National Register of Historic Places criteria for section review purposes; eligible properties are treated as if they were already listed.

National Register of Historic Places (NRHP)—the federal inventory of known historic properties worthy of preservation. The NRHP is administered by the National Park Service on behalf of the Secretary of the Interior; its listings include buildings, structures, sites, objects, and districts possessing historic, architectural, engineering, archaeological, or cultural significance. Properties listed are not limited to those of national significance; most are significant primarily at the regional, state, or local level.

Native Vegetation—often referred to as indigenous, these are plants living or growing naturally in a given region without agricultural or cultivational efforts.

Onset of Temporary Threshold Shift (Onset TTS)—minimum measurable shift in an organism's auditory threshold.

Ordnance—military supplies including weapons, ammunition, combat vehicles, and maintenance equipment.

PUFF—one of the air toxic screening models included in the TSCREEN modeling suite. PUFF is specifically used in conjunction with U.S. Environmental Protection Agency guidance documents to analyze toxic emissions and their dispersion that could result from instantaneous (puff) emissions.

Restricted Area—airspace of defined dimensions, identified on the surface of the earth within which the flight of aircraft, while not wholly prohibited, is subject to restriction. Activities within these areas must be confined, because of their nature, or limitations imposed upon aircraft operations that are not part of these activities, or both. Restricted Areas denote the existence of unusual, often invisible, hazards to aircraft such as artillery firing, aerial gunnery, or guided missiles.

Ruderal Vegetation—weedy and commonly introduced flora growing where natural vegetational cover has been interrupted or disturbed by humans.

Sensitive Habitats—areas of special importance to regional wildlife populations or protected species that have other important biological characteristics (for example, wintering habitats, nesting areas, and wetlands).

Sensitive Receptor—an organism or population of organisms sensitive to alterations of some environmental factor (such as air quality or sound waves) that undergo specific effects when exposed to such alteration.

Site—in archaeology, any location where human beings have altered the terrain or have discarded artifacts.

Sonobuoy—hydrophones, or floating sensors, which acoustically score bomb drops during a training exercise from the sound where a bomb impacts the surface of the ocean.

Special Use Airspace—consists of several types of airspace used by the military to meet its particular needs. Special use airspace consists of that airspace wherein activities must be confined because of their nature, or wherein limitations are imposed upon aircraft operations that are not a part of these activities, or both. Special use airspace, except for

Control Firing Areas, are chartered on Instrument Flight Rules or Visual Flight Rules charts and include hours of operation, altitudes, and the controlling agency.

Special Warfare Operations—operations that provide covert insertion and reconnaissance training for small special warfare units. Activities usually include reconnaissance and surveillance, helicopter raids, and direct action. Units consist of 5 to 20 specialists using helicopters, submarines, and small inflatable boats to gather intelligence, stage raids, and return to their host units.

Species—a taxonomic category ranking immediately below a genus and including closely related, morphologically similar individuals that actually or potentially interbreed.

Threatened Species—plant and wildlife species likely to become endangered in the foreseeable future.

Trade Winds—winds blowing almost constantly in one direction; in particular, a wind blowing almost continually from the equator from the northeast in the belt between the northern horse latitudes and the doldrums and from the southeast in the belt between the southern horse latitudes and the doldrums.

Ungulates—hoofed mammals such as horses, cattle, deer, sheep, and goats.

Visual Flight Rules—rules that govern the procedures for conducting flight under visual conditions; used by pilots and controllers to indicate type of flight plan.

Warning Area—airspace of defined dimensions that may contain hazards to non-participating aircraft in international airspace. Though the activities conducted within Warning Areas may be as hazardous as those in Restricted Areas, Warning Areas cannot be legally designated as Restricted Areas because they are over international waters.

Wetlands—lands or areas that either contain much soil moisture or are inundated by surface or groundwater with a frequency sufficient to support a prevalence of vegetation or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction. Wetlands generally include such areas as bogs, marshes, mud and tidal flats, sloughs, river overflows, seeps, springs, or swamps.

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APPENDIX E

MARINE BIOLOGICAL RESOURCES

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Complex marine ecosystems occur in Hawaiian waters to depths of 5,000 meters (16,500 feet) and extend inland from the coasts to include coastal marine ponds. Several factors control the variety, distribution, and abundance of marine life, including geographic isolation, subtropical climate, storm waves, and human-caused pollution and development.

Marine Environment

Many activities necessary to implement the Proposed Action would be conducted in the marine environment. Therefore, the emphasis in this section is on providing a more detailed description of marine ecosystems and biota, including seabirds, shorebirds, and coastal waterbirds. Terrestrial biological resources are specifically addressed in chapter 3, and are not considered as critical because the proposed action would take place primarily on established military installations and ranges that have been previously disturbed and are covered by existing environmental management plans. The existing marine biological environment addresses four principal attributes: (1) marine fish and Essential Fish Habitat (EFH); (2) marine mammals; (3) migratory birds associated with the marine environment; and (4) threatened and endangered species. Shorebirds are also addressed. In addition, a brief discussion on biological diversity in the marine environment is provided for context.

Biological Diversity

Although oceans have fewer species of plants and animals than terrestrial and fresh water environments, an incredible variety of living things reside in the ocean (Thorne-Miller and Catena, 1991). Marine life ranges from microscopic one-celled organisms to the world's largest animal, the blue whale. Ocean plants and plant-like organisms use sunlight and the minerals in sea water to grow. Sea animals eat these organisms and one another. Marine plants and plant-like organisms can live only in the sunlit surface waters of the ocean, the photic zone, which extends to only about 100 meters (330 feet) below the surface. Beyond the photic zone, the light is insufficient to support plants and plant-like organisms. Animals, however, live throughout the ocean from the surface to the greatest depths.

Marine biological communities can be divided into two broad categories: pelagic and benthic. Pelagic communities live in the water column and have little or no association with the bottom, while benthic communities live within, upon, or associated with, the bottom.

The organisms living in pelagic communities may be drifters (plankton) or swimmers (nekton). The plankton includes larvae of benthic species, so a pelagic species in one ecosystem may be a benthic species in another. The plankton consists of plant-like organisms (phytoplankton) and animals (zooplankton) that drift with the ocean currents, with little ability to move through the water on their own. The mostly one-celled phytoplankton float in the photic zone, where the organisms obtain sunlight and nutrients,

and serve as food for the zooplankton and for some larger marine animals. The zooplankton consists of many kinds of animals, ranging from one-celled organisms to jellyfish up to 2 meters (6 feet) wide, which live in both surface and deep waters of the ocean. Crustaceans make up about 70 percent of all zooplankton. While some zooplankton float about freely throughout their lives, many spend only the early part of their lives as plankton. As adults some become strong swimmers and join the nekton; others settle to the seafloor or attach themselves to it and become part of the benthos.

The nekton consists of animals that can swim freely in the ocean. They are strong swimmers and include fish, squids, and marine mammals. Most species of nektonic animals live near the sea surface, where food is plentiful, but many others live in the deep ocean. Fish are the most important nekton, with over 13,000 kinds of fish living in the ocean. Squids are free-swimming mollusks that live in both surface and deep waters. Nektonic mammals, including porpoises and whales, remain in the ocean for their entire lives. Other marine mammals, such as the Hawaiian monk seal, spend time on land.

It is thought that pelagic systems are controlled primarily by physical factors, including temperature, nutrients, amount of light in the surface waters, and disturbances in the water structure. The latter occurs when winds and other atmospheric conditions drive changes in the circulation patterns of ocean waters. As a result, there are vertical changes in the temperature and nutrient distribution, which in turn affect the vertical distribution of species. There is no clear evidence of biological factors controlling species diversity in these ecosystems, but species interactions have not been well studied.

Benthic communities, or the benthos, are made up of marine organisms that live on or near the seafloor. They may burrow in the seafloor, attach themselves to the bottom, or crawl or swim about within the bottom waters. Where sunlight reaches the seafloor, the benthos includes plants and plant-like organisms, such as seagrass, which become anchored to the bottom. Among the common animals that live on the seafloor are clams, crabs, lobsters, starfish, and several types of worms. Bottomfish are fish that have adapted to life on the seafloor. Barnacles, clams, oysters, and various snails and worms are among the animals that begin life as zooplankton, but on reaching maturity sink to the seafloor and become part of the benthos.

The greatest known diversity of marine species exists in benthic communities, especially in coral reefs. The benthic environment includes the intertidal shore; the shallow subtidal shelf; the deep abyssal plains; and isolated ecosystems such as coral reefs, seamounts, and deep-sea trenches. The substrate may vary considerably, with distinct differences between hard-bottom and soft-bottom communities. The type of bottom has a big effect on the nature of the community that lives there. Beyond that single physical factor, species diversity is maintained by biological mechanisms—competition, predation, larval recruitment, and biological structuring of the substrate—and/or physical mechanisms, such as nutrients, light, waves, and currents.

Marine Fish, Essential Fish Habitat, and Coral

Much of what is known about the biology of the deep ocean waters surrounding the Hawaiian Islands is based on limited information gleaned from studies on sport and commercial fisheries. Pelagic ocean and deep seafloor (benthic) ecosystems occur in the deep open waters beyond the neritic shallow-water zone around all the islands and on, and above, the seafloor at depths greater than 200 meters (660 feet). Pelagic ocean waters are exposed to swells, currents, and winds from all directions, generally beyond the sheltering effects of the islands. Deep currents and eddies are also associated with this zone. Sunlight is absent on the deep seafloor. Basalt and carbonate rock substrates are common on slopes, with sediments prevalent on flatter surfaces. Bottom sediments surrounding Oahu are composed largely of muds washed as organic matter (detritus) from the adjacent islands, and sand and gravel of shallow-water origin.

Phytoplankton are the only abundant plants in the pelagic zone; living plants are rare or absent on the deep seafloor. Zooplankton, fishes, squids, sea turtles, marine mammals, and various seabirds forage in neritic or pelagic waters. At depths in excess of 100 meters (330 feet), many benthic organisms live where there is little or no light and maintain themselves on detritus and planktonic organisms in the water column.

The Magnuson-Stevens Act defines EFH as those waters and substrates necessary to fish for spawning, breeding, feeding, or growth to maturity. "Waters," when used for the purpose of defining EFH, include aquatic areas and their associated physical, chemical, and biological properties that are used by fish, and may include historical areas of use where appropriate. Substrate includes sediment, hard bottom, underlying structures, and associated biological communities. The designation of EFH by the Western Pacific Regional Fishery Management Council was based on the best scientific data available. Careful judgment was used in determining the extent of EFH that should be designated to ensure that sufficient habitat in good condition is available to maintain a sustainable fishery and the managed species contribution to a healthy ecosystem.

National Marine Fisheries Service guidance governing implementation of the EFH amendments calls for the identification of habitat areas of particular concern. Habitat areas of particular concern could need higher levels of protection than other habitat from adverse effects, including impacts from non-fishing related activities as well as from fishing and activities supporting fishing industries. Habitats that are limited geographically or are unusually productive may be designated as reserves or sanctuaries where appropriate. Identifying potentially threatening activities to habitat areas of particular concern is a complex task, since impacts from different activities, or from the same activity repeated over time, can be cumulative throughout the ecosystem.

To manage the EFH areas, the National Marine Fisheries Service has placed the managed species in four categories: bottomfish management unit species, pelagic management unit species, crustacean management unit species, and precious coral management unit species.

Except for major commercial species, little is known about the life histories, habitat utilization patterns, food habits, or spawning behavior of most adult bottomfish and seamount groundfish species. Furthermore, very little is known about the distribution and habitat requirements of juvenile bottomfish.

The distribution of adult bottomfish is closely linked to suitable physical habitat. Unlike the U.S. mainland with its continental shelf ecosystems, Pacific islands are primarily volcanic peaks with steep drop-offs and limited shelf ecosystems. The bottomfish management unit species under the Western Pacific Regional Fishery Management Council's jurisdiction are found concentrated on the steep slopes of deep-water banks. The approximately 200-meter (660-foot) isobath is commonly used as an index of bottomfish habitat. Adult bottomfish are usually found in habitats characterized by a hard substrate of high structural complexity. Bottomfish populations are not evenly distributed within their natural habitat; instead they are dispersed in a non-random, patchy fashion.

There is regional variation in species composition, as well as a relative abundance of the bottomfish management unit species of the deep-water bottomfish complex. The target species are generally found at depths of approximately 50 to 270 meters (160 to 890 feet).

The Western Pacific Regional Fishery Management Council has designated this area as bottomfish EFH. The species designations include deep-slope bottomfish (shallow- and deepwater) and seamount groundfish complexes. Shallow-water species are those in the 0- to 100-meter (0- to 330-foot) depths. Deep-water species are those in the approximately 100- to 400-meter (330- to 1,300-foot) depths. Because of the known depth and bottom types preferred by bottomfish, and the pelagic nature of their eggs and larvae, the Western Pacific Regional Fishery Management Council has designated the water column and all bottom habitats from the shoreline to a depth of 400 meters (1,300 feet) around the Hawaiian Islands as EFH. The Western Pacific Regional Fishery Management Council has also designated all escarpments and slopes between approximately 40 to 280 meters (130 to 920 feet) as habitat areas of particular concern.

The life histories of most of the commercial, recreational, and other fish species (marketable, non-marketable, and sharks) are not well known. Most are pelagic spawners. However, the National Marine Fisheries Service has designated the marine environment from the shore to the 22-kilometer (12-nautical-mile) limit as EFH. Areas of most concern in Hawaii are escarpments, locations of high structural complexity, live coral heads and reefs, and nursery areas. Examples include coral reefs, fringing reefs, lagoons, estuaries, tidal mangrove vegetation, and seagrass beds. There are large gaps in the scientific knowledge of the basic life histories and habitat requirement for many of the species that make up the pelagic management unit species. Therefore the Western Pacific Regional Fishery Management Council has adopted a 1,000-meter (3,300-foot) depth as a lower boundary of the EFH for pelagic management unit species, and 200 meters (660 feet) from the shoreline to the outer limit of the Exclusive Economic Zone (EEZ) as the upper limit of the EFH covering the eggs and larvae of the pelagic management unit species. The EEZ extends from seaward of the state's boundary out to 370 kilometers (200 nautical miles) from land.

Spiny lobsters are found throughout the Indo-Pacific Region. All spiny lobsters in the western Pacific region belong to the family Palinuridae. The slipper lobsters belong to the family Scyllaridae. The Hawaiian spiny lobster (*Panulirus marginatus*) is endemic to Hawaii and is the primary species of interest in the Northwestern Hawaiian Islands fishery. In Hawaii, adult spiny lobsters are typically found on rocky substrate in well-protected areas, in crevices, and under rocks. The reported depth of the Hawaiian spiny lobster is from approximately 3 to 200 meters (10 to 660 feet), but is generally most abundant in waters of 90 meters (300 feet) or less. The Kona crab, family Raninidae, is taken in low numbers in the Northwestern Hawaiian Islands fishery. The Western Pacific Regional Fishery Management Council has designated the EFH for crustacean management unit species based on complexes or assemblages. The two complexes are the spiny and slipper lobster complex and the Kona crab complex.

For spiny lobster larvae, the EFH is the water column from the shoreline to the outer limit of the EEZ down to a depth of 150 meters (450 feet). The EFH for juvenile and adult spiny lobster is designated as the bottom habitat from the shoreline to a depth of 100 meters (330 feet). The Council has also designated all banks with summits less than 30 meters (95 feet) in the Northwestern Hawaiian Islands as habitat areas of particular concern for spiny lobster.

Black, pink, gold, and bamboo corals, collectively referred to as precious corals, occur in deep inter-island channels and off promontories at depths between 15 and 1,500 meters (50 and 4,920 feet). These coral species are included as management unit species in the Precious Corals Fisheries Management Plan. The Council has designated the six known beds of deep-water precious coral (pink, gold, and bamboo) as EFH for precious coral management unit species. The six known precious coral beds are located at Keahole Point, Makapuu, Kaena Point, Wespac, Brooks Bank, and 180 Fathom Bank. In addition, the agency has also designated the three black coral beds in the main Hawaiian Islands as EFH for precious coral management unit species. The three black coral beds are located between Milolii and South Point on Hawaii, Auau channel between Maui and Lanai, and the southern border of Kauai. The Council has designated three of the six known deep-water precious coral beds (Makapuu, Brooks Bank, Wespac) are designated as habitat areas of particular concern. For black corals, the Council has designated Auau channel as habitat areas of particular concern.

Marine Mammals

Both the Endangered Species Act and the Marine Mammal Protection Act protect the marine mammals present in the waters around the Hawaiian Islands. Table E-1 identifies those species that are not listed as threatened or endangered, but are protected by the Marine Mammal Protection Act. The listed species are discussed under the heading Threatened and Endangered Species below.

Migratory Birds

Thirty-nine species of migratory seabirds are known to occur in the Hawaiian Island chain. Twenty-two of these species breed in Hawaii. The foraging range of some of these species is estimated to be between 159 and 480 kilometers (98 and 300 miles). Seabirds

(e.g., red-footed boobies (*Sula sula*), masked boobies (*Sula dactylatra*), white-tailed tropicbirds (*Phaethon lepturus*), red-tailed tropicbirds (*Phaethon rubricauda*), sooty terns (*Sterna fuscata*), brown noddies (*Anous stolidus*), and others from the colonies located at Kaula, Niihau, Kauai, and Oahu may be observed foraging in the coastal pelagic waters that surround all of these islands. The short-tailed albatross (*Phoebastria albatrus*) has been observed on Pacific Missile Range Facility, Kauai.

Table E-1: Protected Marine Mammals Found in Hawaiian Waters

Type	Common Name	Scientific Name
Odontocetes		
Toothed Whale	Bottlenose Dolphin	<i>Tursiops truncatus</i>
Toothed Whale	Hawaiian Spinner Dolphin	<i>Stenella longirostris</i>
Toothed Whale	Spotted Dolphin	<i>Stenella attenuata</i>
Toothed Whale	Striped Dolphin	<i>Stenella coeruleoalba</i>
Toothed Whale	Blainville's Beaked Whale	<i>Mesoplodon densirostris</i>
Toothed Whale	Cuvier's Beaked Whale	<i>Ziphius cavirostris</i>
Toothed Whale	False Killer Whale	<i>Pseudorca crassidens</i>
Toothed Whale	Killer Whale	<i>Orcinus orca</i>
Toothed Whale	Melon-headed Whale	<i>Peponocephala electra</i>
Toothed Whale	Risso's Dolphin	<i>Grampus griseus</i>
Toothed Whale	Rough-toothed dolphin	<i>Steno bredanensis</i>
Toothed Whale	Short-finned Pilot Whale	<i>Globicephala macrorhynchus</i>
Toothed Whale	Pygmy Sperm Whale	<i>Kogia breviceps</i>
Toothed Whale	Dwarf Sperm Whale	<i>Kogia simus</i>
Mysticetes		
Baleen Whale	Bryde's Whale	<i>Balaenoptera edeni</i>

Migratory shorebirds and waterbirds are also relatively common (table E-2) in the Hawaiian Islands, although within the ROI, the number of species present is limited and is potentially associated with the shallow-water recovery site only.

Threatened and Endangered Species

An endangered species is one that is in danger of extinction throughout all or a significant portion of its range. A threatened species is one that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. Endangered marine mammals found in Hawaii include the Hawaiian monk seal, humpback whale, blue whale, fin whale, and sperm whale (table E-3). The Marine Mammal Protection Act also protects all of these endangered marine mammals.

Also listed are two turtles: the green sea turtle (*Chelonia mydas*) and the hawksbill sea turtle (*Eretmochelys imbricata*). There are six endangered migratory bird species in the Hawaiian Islands: short-tailed albatross, Hawaiian petrel (*Pterodroma phaeopygia*),

Hawaiian moorhen (*Gallinula chloropus sanvicensus*), Hawaiian duck (*Anas wyvilliana*), Hawaiian coot (*Fulica alai*), and Hawaiian black-necked stilt (*Himantopus mexicanus knudseni*). There is also one threatened seabird: Newell's shearwater (*Puffinus newelli*). The threatened and endangered species are discussed below.

Table E-2: Migratory Birds in the Hawaiian Islands

Scientific Name	Common Name	Status
Migratory Seabirds		
<i>Phoebastria albatrus</i>	Short-tailed Albatross	Vo E
<i>Phoebastria nigripes</i>	Black-footed Albatross	Bi
<i>Phoebastria immutabilis</i>	Laysan Albatross	Bi
<i>Fulmarus glacialis</i>	Northern Fulmar	Vo
<i>Pterodroma phaeopygia</i>	Hawaiian Petrel	Bes E
<i>Pterodroma externa</i>	Juan Fernandez Petrel	Vo
<i>Pterodroma cervicalis</i>	White-necked Petrel	Vo
<i>Pterodroma inexpectata</i>	Mottled Petrel	Vo
<i>Pterodroma hypoleuca</i>	Bonin Petrel	Bi
<i>Pterodroma nigripennis</i>	Black-winged Petrel	Vo
<i>Bulweria bulwerii</i>	Bulwer Petrel	Bi
<i>Puffinus carneipes</i>	Flesh-footed Shearwater	Vo
<i>Puffinus pacificus</i>	Wedge-tailed Shearwater	Bi
<i>Puffinus griseus</i>	Sooty Shearwater	Vr
<i>Puffinus tenuirostris</i>	Short-tailed Shearwater	Vo
<i>Puffinus nativitatis</i>	Christmas Shearwater	Bi
<i>Puffinus newelli</i>	Newell's Shearwater	Be T
<i>Oceanodroma leucorhoa</i>	Leach Storm-Petrel	Vr
<i>Oceanodroma castro</i>	Band-rumped Storm-Petrel	Bi
<i>Oceanodroma tristrami</i>	Tristram Storm-Petrel	Bi
<i>Phaethon lepturus</i>	White-tailed Tropicbird	Ri
<i>Phaethon rubricauda</i>	Red-tailed Tropicbird	Bi
<i>Sula dactylatra</i>	Masked Booby	Ri
<i>Sula leucogaster</i>	Brown Booby	Ri
<i>Sula sula</i>	Red-footed Booby	Ri
<i>Fregata minor</i>	Great Frigatebird	Ri
<i>Stercorarius pomarinus</i>	Pomarine Jaeger	Vr
<i>Larus atricilla</i>	Laughing Gull	Vo
<i>Larus philadelphia</i>	Bonaparte Gull	Vo
<i>Larus delawarensis</i>	Ring-billed Gull	Vo
<i>Larus argentatus</i>	Herring Gull	Vo
<i>Larus glaucescens</i>	Glaucous-winged Gull	Vo

Table E-2: Migratory Birds in the Hawaiian Islands (Continued)

Scientific Name	Common Name	Status
Migratory Seabirds (Continued)		
<i>Sterna antillarum</i>	Least Tern	Vo
<i>Sterna lunata</i>	Gray-backed Tern	Bi
<i>Sterna fuscata</i>	Sooty Tern	Bi
<i>Anous stolidus</i>	Brown Noddy	Ri
<i>Anous minutus</i>	Black Noddy	Res
<i>Procelsterna cerulea</i>	Blue-gray Noddy	Ri
<i>Gygis alba</i>	White Tern	Ri
Migratory Waterbirds		
<i>Dendrocygna bicolor</i>	Fulvous Whistling-Duck	Ri
<i>Branta bernicla</i>	Brant	Vo
<i>Branta canadensis</i>	Canada Goose	Vo
<i>Anas crecca</i>	Green-winged Teal	Vr
<i>Anas platyrhynchos</i>	Mallard	Vo
<i>Anas acuta</i>	Northern Pintail	Vc
<i>Anas querquedula</i>	Garganey	Vo
<i>Anas discors</i>	Blue-winged Teal	Vo
<i>Anas clypeata</i>	Northern Shoveler	Vc
<i>Anas americana</i>	American Wigeon	Vr
<i>Aythya collaris</i>	Ring-necked Duck	Vo
<i>Aythya afinis</i>	Lesser Scaup	Vr
<i>Gallinula chloropus sandvicensis</i>	Hawaiian Moorhen	Be E
<i>Anas uyvilliana</i>	Hawaiian Duck	Be E
<i>Himantopus mexicanus knudseni</i>	Hawaiian Black-necked Stilt	Be E
<i>Fulica alai</i>	Hawaiian Coot	Be E
Migratory Shorebirds		
<i>Egretta caerulea</i>	Little Blue Heron	Vo
<i>Nycticorax nycticorax</i>	Black-crowned Night-Heron	Ri
<i>Pluvialis squatarola</i>	Black-bellied Plover	Vr
<i>Pluvialis dominica</i>	Lesser Golden-Plover	Vc
<i>Charadrius semipalmatus</i>	Semipalmated Plover	Vo
<i>Tringa flavipes</i>	Lesser Yellowlegs	Vr
<i>Heteroscelus incanus</i>	Wandering Tattler	Vc

Table E-2: Migratory Birds in the Hawaiian Islands (Continued)

Scientific Name	Common Name	Status
Migratory Shorebirds (Continued)		
<i>Numenius tahitiensis</i>	Bristle-thighed Curlew	Vr
<i>Limosa lapponica</i>	Bar-tailed Godwit	Vo
<i>Arenaria interpres</i>	Ruddy Turnstone	Vc
<i>Calidris alba</i>	Sanderling	Vc
<i>Calidris mauri</i>	Western Sandpiper	Vo
<i>Calidris minutilla</i>	Least Sandpiper	Vo
<i>Calidris melanotos</i>	Pectoral Sandpiper	Vr
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	Vr
<i>Calidris alpina</i>	Dunlin	Vr
<i>Philomachus pugnax</i>	Ruff	Vo
<i>Limnodromus griseus</i>	Short-billed Dowitcher	Vo
<i>Limnodromus scolopaceus</i>	Long-billed Dowitcher	Vr
<i>Gallinago gallinago</i>	Common Snipe	Vo
<i>Phalaropus tricolor</i>	Wilson Phalarope	Vo

Symbols for Status:

E = Endangered. **T** = Threatened. **Be** = Breeder; species breeds only in Hawaii. **Bes** = Breeder; Species also breeds elsewhere; Hawaiian subspecies breeds only in Hawaii. **Bi** = Breeder; Hawaiian also breeds elsewhere. **Res** = Resident; indigenous species; Hawaiian subspecies is endemic. **Ri** = Resident; indigenous species; Hawaiian form is not endemic. **Vo** = Visitor; occasional to frequent migrant to Hawaii. **Vr** = Visitor; regular migrant to Hawaii in small numbers.

Table E-3: Threatened and Endangered Marine Mammals, Turtles, Seabirds, and Waterbirds found in Hawaiian Waters

Type	Common Name	Scientific Name	Status
Toothed Whale	Sperm Whale	<i>Physeter macrocephalus</i>	Endangered
Mysticete Whale	Humpback Whale	<i>Megaptera evagelae</i>	Endangered
Mysticete Whale	Blue Whale	<i>Balaenoptera musculus</i>	Endangered
Mysticete Whale	Fin Whale	<i>Balaenopter physalus</i>	Endangered
Seal and Sea Lion	Hawaiian Monk Seal	<i>Monachus schauinslandi</i>	Endangered
Sea Turtle	Green Sea Turtle	<i>Chelonia mydas</i>	Threatened
Sea Turtle	Hawksbill Sea Turtle	<i>Eretmochelys imbricata</i>	Endangered
Seabird	Hawaiian Petrel	<i>Pterodroma phaeopygia</i>	Endangered
Seabird	Short-Tailed Albatross	<i>Phoebastria albatrus</i>	Endangered
Seabird	Newell's Shearwater	<i>Puffinus newelli</i>	Threatened
Waterbird	Hawaiian Moorhen	<i>Gallinula chloropus sandvicensis</i>	Endangered
Waterbird	Hawaiian Duck	<i>Anas wyvilliana</i>	Endangered
Waterbird	Hawaiian Coot	<i>Fulica alai</i>	Endangered
Waterbird	Hawaiian Black-Necked Stilt	<i>Himantopus mexicanus knudseni</i>	Endangered

Humpback Whale

During the months of January through April, humpback whales are the most common marine mammal species found in the Hawaiian waters. Most humpback whales depart Hawaii for the northern feeding grounds before June. The original population of humpback whales may have been as high as 120,000 worldwide. By the 1970s, the population has been reduced to about 10,000 to 12,000 worldwide. The major cause for the decline was commercial whaling, which was banned in 1966 and stopped entirely during the 1970s. Since then, the population in the Hawaiian Islands has risen slowly from under 1,000 to between 3,000 and 4,000. Humpback whales generally migrate to the Hawaiian Islands each winter from northern feeding grounds. The whales are primarily seen between December and May of each year. The humpback whale is the only animal that has an entire marine sanctuary dedicated to its survival. The Hawaiian Islands Humpback Whale National Marine Sanctuary covers areas off the shorelines of all the major Hawaiian Islands, with an emphasis on areas generally within the 183-meter (600-foot) contour (isobath) between the islands of Molokai, Lanai, and Maui, including the Penguin Bank. The sanctuary area encompasses 3,370 square kilometers (1,300 square miles), much of it within 4.8 kilometers (3 miles) of the shoreline.

Sperm Whale

Sperm whales are listed as endangered, but in fact are considered to be the most abundant of the large whale species, with an estimated 1.9 million animals worldwide. Sperm whales migrate to the higher latitudes during the summer with the mature males migrating much farther north than females and the younger males. In the Pacific Ocean, females and younger whales usually remain in tropical and temperate waters. Males may continue north to the Gulf of Alaska and the Aleutians. Females and younger animals may be restricted in their migrations by warmer waters, and many of the larger males return during the winter months to breed. Historically, sperm whaling grounds in the Pacific Ocean south of 40 degrees North latitude were located around the Hawaiian Islands. Sperm whales are deep-diving animals and are generally found in deep waters. All sperm whales sighted in 1993 to 1998 aerial surveys were found in waters deeper than 1,800 meters (6,000 feet). When they have been found relatively close to shore, sperm whales are usually associated with sharp increases in bottom depth where upwelling likely occurs and biological productivity is high. They can dive to depths exceeding 2,000 meters (6,500 feet) and may remain submerged for more than an hour.

Fin Whale

At 21 meters (70 feet) long, the fin whale is the second largest whale in the world. Listed as endangered, the fin whale lives in all oceans and seas of the world from tropical to polar latitudes. They tend to be very nomadic and migrate several thousand miles to equatorial waters. During the winter, they fast almost completely, living off their fat reserves. Mating occurs throughout the winter, and young are born a year later between December and April. The fin whale often feeds by coursing through the water on its side, straining out small fish and krill between its baleen plates. They are one of the fastest of the large whales, cruising at an average speed of 22 kilometers per hour (12 knots). These whales avoid noisy boats, but will swim up beside a stopped vessel. Fin whales migrate into Hawaiian waters mainly in autumn and winter and are rare in Hawaiian

waters. The status of fin whales in Hawaiian waters is unknown and there is insufficient data to evaluate trends in abundance.

Blue Whale

The blue whale is currently one of the world's most endangered whales and is extremely rare in Hawaii. The blue whale, with lengths up to 30 meters (100 feet), is the largest animal on earth. Blue whales are found in open oceans from the waters of the extreme Southern Hemisphere to the Aleutian Islands off Alaska at the northern boundary of the Pacific Ocean. They spend their summers in polar waters because food production (krill) is higher there. In the winter blue whales migrate several thousand miles to warmer tropic and subtropic areas to breed and calve. During the winter they fast; the fat on their body is enough to see them through the winter. The status of blue whales in Hawaiian waters is unknown and there is insufficient data to evaluate trends in abundance.

Hawaiian Monk Seal

While in previous times it was assumed that the endangered Hawaiian monk seal only inhabited the Northwestern Hawaiian Islands, they have recently been observed near the main Hawaiian Islands. Data from the Hawaiian Islands Humpback Whale National Marine Sanctuary Final Environmental Impact Statement indicated that as many as 39 sightings near the island of Oahu may occur in a single year. Although the seals must obviously swim between the islands, they are most often seen close to the islands, including one early observation near the entrance to Pearl Harbor in July 1978. The seal's breeding season tends to occur from spring to early summer, with most births occurring during March to May. Pupping occurs on beaches, including at least one pup born on Oahu.

Green Sea Turtle

The green sea turtle is found throughout the tropical Pacific. Although 90 percent of green sea turtles originate in the Northwestern Hawaiian Islands, the main feeding grounds for adults and juveniles are in the main Hawaiian islands. No nesting occurs on Oahu. Hatchlings emerge after an incubation period on sandy beaches and then lead a pelagic existence for 3 years. The 3-year-old juveniles then come near shore, mainly on the leeward side of islands, and begin feeding on benthic algae and seagrass for the next 2 years or so. After reaching sexual maturity (20 to 25 years) they migrate to French Frigate Shoals in the Northwestern Hawaiian Islands to breed.

Hawksbill Sea Turtle

The Hawksbill sea turtle is a medium-sized turtle found in tropical waters, often on coral reefs. It is known infrequently in the waters off the Hawaiian Islands. It is a solitary nester and is known to use isolated beaches on the islands of Hawaii and Maui.

Short-tailed Albatross

The short-tailed albatross is a large pelagic bird with long, narrow wings adapted for soaring just above the water surface. The large-beaked birds are long-lived and slow to mature. Nesting habitat is generally flat or sloped sites with sparse or full vegetation on

isolated windswept offshore islands with restricted human access. The normal diet is fish, crustaceans, and squid, which come to the ocean's surface at night. Short-tailed albatross once ranged throughout most of the North Pacific Ocean and Bering Sea, with no known nesting colonies on numerous western Pacific Islands in Japan and Taiwan. The short-tailed albatross is currently found on the Izu Islands; Senkaku Islands; and Midway Atoll, Northwestern Hawaiian Islands. Since the mid-1970s about thirty-five sightings of short-tailed albatrosses have occurred during the breeding season on Midway Atoll. The short-tailed albatross was listed on 2 November 2000 as endangered throughout its range.

Hawaiian Petrel

The Hawaiian petrel has a dark gray head, wings, and tail, and a white forehead and belly. Its stout bill is hooked at the tip. The Hawaiian petrel are residents of the central subtropical Pacific Ocean and are known to breed only within the major Hawaiian Islands, where they have well established breeding populations. The largest breeding colony is at Haleakala Crater on Maui. The species is currently known to nest only at elevations above 2,195 meters (7,200 feet), where vegetation is sparse and the climate is dry. Nesting burrows are commonly located among large rock outcrops or other areas with suitable underlying soil. The Hawaiian petrel breeds between March and November and spends most of its time in pelagic habitat during the non-breeding season, feeding on fish, crustaceans, and squid. Based on their very limited present distribution and the marginal status of known breeding populations, the Hawaiian petrel was listed as endangered in 1967.

Hawaiian Moorhen

The Hawaiian moorhen, known as the most secretive native waterbird, can generally be found in freshwater marshes, taro patches, irrigation ditches, reedy margins of watercourses, reservoirs, and wet pastures. They favor dense vegetation near open water and floating or barely emergent mats of vegetation. Moorhen do not frequent brackish water and are not generally present in saline habitats. The Hawaiian moorhen generally nests in areas of standing freshwater depths of less than 60 centimeters (24 inches). Hawaiian moorhen nest year-round, but the active season is March through August. The Hawaiian moorhen inhabits the islands of Kauai and Oahu. The Kauai population is distributed in lowland wetlands and valleys. Hawaiian Moorhens are widely distributed on Oahu, mostly between Haleiwa and Waimanalo. The Hawaiian Moorhen is listed as endangered by the U.S. Fish and Wildlife Service.

Hawaiian Duck

The endangered Hawaiian duck uses a wide variety of natural wetland habitats for nesting and feeding including freshwater marshes, coastal ponds, flooded grasslands, streams, and forest swamplands from elevations ranging from sea level to 3,000 meters (9,900 feet). Artificial wetlands (taro, lotus, shrimp, and fish ponds) supplement existing habitat and provide important feeding habitat. Hawaiian ducks eat mollusks, insects, and freshwater vegetation. They nest year-round, but the main breeding season is between January and May. Nests are on the ground near water. The current population, estimated to be 2,500, is found on Niihau, Kauai, Oahu, Maui, and Hawaii. The estimated

population on Oahu is 300. On Oahu, Hawaiian ducks frequent wetland complexes on the windward coast and north shore. In addition, several individuals have been reported from the wetlands near Pearl Harbor.

Hawaiian Coot

The Hawaiian coot is a federally listed endangered waterbird endemic to the Hawaiian Islands. They are generally found in the coastal plain, usually found below 400 meters (1,320 feet), and prefer wetland habitats with suitable emergent plant growth interspersed with open water. Hawaiian coots prefer freshwater wetlands and taro patches, but will frequent freshwater reservoirs, brackish wetlands, or rarely saline water. Coots nest in open fresh and brackish ponds, irrigation ditches, on shallow reservoirs, and small openings of marsh vegetation, where they construct floating nests of aquatic vegetation in open water or semi-floating nests anchored to emergent vegetation, or in clumps of wetland vegetation. Although some nesting takes place year-round, nesting mostly occurs from March through September. The Hawaiian coot population of between 2,000 and 4,000 birds currently inhabits all of the main Hawaiian Islands except Kahoolawe. On Oahu, the Hawaiian coot is regularly recorded at wetlands along the east west, and north shores, and less frequently at wetlands along the south shore and interior reservoirs.

Hawaiian Black-necked Stilt

The endangered Hawaiian black-necked stilt is a wading bird that is found on all main Hawaiian Islands except Kahoolawe. Hawaiian black-necked stilts use a variety of aquatic habitats but are limited by water depth and vegetation cover. They require early successional marshlands with water depth less than 24 centimeters (9 inches), perennial vegetation that is limited and low growing, or exposed tidal flats. Hawaiian black-necked stilts generally forage and nest in different wetland sites, moving between these areas daily. Feeding habitat consists of shallow water that is fresh, brackish, or saline. Nesting occurs on freshly exposed mudflats, interspersed with low-growing vegetation. The nesting season normally extends from March through August, and peaks in May and June. The current population is estimated between 1,200 and 1,600. Oahu has the largest population with the majority of the Hawaiian black-necked stilts found on the north and windward coasts. Isolated populations also exist in Pearl Harbor and along the leeward coast.

Newell's Shearwater

The Newell's shearwater has a glossy black top, white bottom, and black bill that is sharply hooked at the tip. The bird feeds primarily on squid. Newell's shearwater breeds in dense fern habitat with steep mountainous terrain between 150 and 700 meters (500 and 2,300 feet) in elevation. During their nine-month breeding season from April through November, Newell's shearwaters live in burrows. Although they are capable of climbing shrubs and trees before taking flight, it needs an open downhill flight path through which it can become airborne. Newell's shearwaters are residents of the central subtropical Pacific Ocean and are known to breed only within the major Hawaiian Islands. The Newell's shearwater is believed to have had well-established breeding populations on all of the major Hawaiian Islands. Based on their very limited present distribution and the marginal status of breeding populations, the Newell's shearwater was listed as a threatened species in 1975 by the U.S. Fish and Wildlife Service.

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